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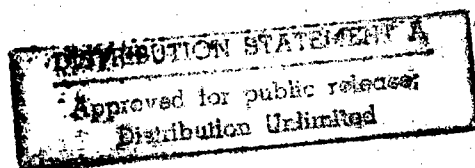
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USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES



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8 August 1984

USSR REPORT

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

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AEROSPACE MEDICINE

PILOT JET LAG EXPERIMENTS DESCRIBED

Moscow SOVETSKAYA ROSSIYA in Russian 22 Apr 84 p 6

[Article by V. Golovanov: "Making Work in the Sky Easier"]

[Text] Viktor Artemov looked like a man from outer space: His chest tightened up, his vest was full of sensors, a fabric collar with wire leads lay on his head; there were rubber bands on his arms, and sensitive thermometers were pressed against his ankles.

The door of the hermetic isolation room slammed shut; now instruments would be observing Artemov's condition--his pulse rate lit up as a neon snake on the display screen, and a special instrument was tracking respiration frequency. I looked into the little window: Viktor lay back in the easy chair. In front of him was something resembling an instrument panel, lights, knobs, and a special control lever with which pilots maintain an airplane's course upon landing. In back of him was a noise gauge sphere and the smooth steel of the walls.

"Ready!" says the muffled voice in the loudspeaker.

A sign lights up on the door: "Silence! Experiment in Progress."

"The experiment will last eight hours," says Chief of the Medical-Hygiene Research Laboratory of the Civil Aviation Scientific-Research Institute A. K. Sgibnev. "That is about the same time that pilots spend on long-distance flights."

Today's experiment is an integral part of a program for studying the working conditions of a flight crew. It would seem that there are no other professional personnel that are the subject of such thorough medical studies as are pilots. And yet, up to this day, we are still not clear about how, for example, their health and work capacity are affected by their specific working conditions--the constant shifting from one climate zone to another, crossing time zones and the changes in the "microclimate" in the airplane. Until the present time, somehow all efforts were directed at improving technology with no attention given to those factors. But people surely are apt to make errors (we shall look at the problem from this aspect). It is known that while flying toward night-time, flight crews are apt to

make mistakes several times more often than when "catching up" with daytime. Apparently, daylight is a supplementary factor that stimulates a pilot's attention and for which not even the most modern technology has been able to find a substitute.

Another example: It is well known that the air gets into the plane's cabin from behind the ship. The ship's temperature practically remains unchanged during flight, but the humidity falls as the plane's altitude increases. Passengers sense this by a sudden feeling of thirst (from this point of view a glass of soda water would not be such a bad idea). It is much more difficult for pilots who spend about 100 hours a month in flight. Hence, we hear numerous complaints about dryness of the nose and throat and sharp pain in the eyes. After having simulated an airliner's microclimate, associates at the Institute find that the matter is not limited to these manifestations: Sudden changes in humidity lead to lowered pulse pressure, peripheral vascular spasms, and tachycardia.

It is not quite a joke to tell about the laboratory workers (perfectly healthy young fellows, although not professional pilots) who found themselves under such conditions and experienced something like a heart attack!

As a result of investigations, the Civil Aviation Scientific-Research Institute recommended that aeronautical industry enterprises equip airline cabins with aerosol air humidifiers. This equipment has now been made and tested and will be installed in all IL-86 and TU-156 planes.

The hermetic chamber in which the tests are being carried out is the only one in our country. Practically any kind of climatic condition can be reconstructed in the chamber. The experiment participants work in circumstances that are far from ideal. The "pilots" hear tape-recorded engine noises, and the "dispatchers" hear the same take-off and landing announcements as are heard at a real airport. Errors made by the test subject are noted by an audible signal. This is necessary in order to bring laboratory conditions close to the real conditions where stress situations are unavoidable.

The first part of the experiment is finished. The control characteristics in an optimum medium are removed: Temperature is 22 above, relative humidity is 30 percent. I went inside the chamber: Almost at once, heat came in from somewhere and water began to drip into the nickel-plated pan of the air conditioner. We are in Sochi. It's 28 degrees above. It's humid as a hot-house. It is stuffy. Then there is a brief command on the microphone:

"Viktor, get ready. We're going to test the rate of stress reaction..."

"Pilots make up a most "mobile" profession," explained A. K. Sgibnev. "A pilot may in Moscow in the morning and, let's say, Delhi in the evening. Can you imagine what such a climate change can mean? Primary acclimatization takes three to four days in "ordinary" people. Up to that time there is a sense of sluggishness and headache."

There are as yet no scientifically substantiated recommendations as to how long a crew must be under the new conditions before the body readjusts. This could take days or more. The problem is to determine this experimentally, and to demonstrate with mathematical precision time changes in fatigue, visual and aural reaction rates, and the general condition of the body....

"Viktor, get ready...."

The experiments continue on land so that work in the sky might be made easier.

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AGROCHEMICAL EFFECTIVENESS OF NEW PHOSPHORIC FERTILIZER - SUPERPHOS.
2 COMMUNICATION. RESULTS OF STUDIES ON CHERNOZEM SOILS

Moscow AGROKHIMIYA in Russian No 11, Nov 83 (manuscript received 21 Mar 83)
pp 18-24

SIDORINA, L. V., OSTANIN, A. I., PODKOLZINA, G. V., ZAVERTYAYEVA, T. I.
and PICHAK, A. P., NIUIF (Scientific Research Institute of Fertilizers,
Insecticides and Fungicides imeni Ya. V. Samoylov)

[Abstract] Experimental results of field and vegetative studies of the effectiveness of superphos on chernozem soil are reported. Finely-ground phosphorites from Kingisepp, Yegor'yev, Verkhne-Kamsk, Chilisaysk and Maardu deposits were used. In comparison to double superphosphate, superphos exhibited a 75-100% activity in different variants of the soil or origin of phosphate. On chernozem, the effect of superphos was lower than that of the double superphosphate. In the range of 1-4 mm, the size of the granules did not appear to have any effect of the effectiveness of the fertilizer. In isolated cases, superphos was less effective in providing the level of phosphorus capable of entering the root system of the plants. In poor meteorological conditions which led to poor growth and development of the plants, superphos showed a weaker effect than double superphosphate on chernozem soils.

[1049-7813]

CONTENT OF PRINCIPAL NUTRITION ELEMENTS IN SOIL AND PLANT NITROGEN IN RELATIONSHIP TO PRODUCTIVITY OF WINTER WHEAT GRAIN UNDER CONDITIONS OF UKRAINIAN LESOSTEPPE WEST OF DNIEPER RIVER (PRAVOBEREZHNYYE)

Moscow AGROKHIMIYA in Russian No 11, Nov 83 (manuscript received 14 Jan 83)
pp 43-48

SHEVCHENKO, A. I. and BORSUK, G. Ye., Mironov Scientific Research Institute of Selection and Wheat Seed Growing, Kiev Oblast

[Abstract] Varying the mineral fertilizers in a broad spectrum, the following problems were studied on winter wheat: 1) ability of the soil to provide ammonia and nitrate nitrogen to the plants along with labile phosphorus, and metabolic potassium during their prime growth and development phases and 2) relationship of analytical results of plants and various soil layers with grain crops coupled with possible establishment of gradient requirements for supplying the soil with nitrates and the plants with nitrogen during an initial vegetative period. It was established that the content of nitrogen in the 0-40 cm soil layer was more closely related to grain crop than the 0-20 cm layer; the content of labile phosphorus and metabolic potassium had about the same effect, regardless of the depth of the layer. On the basis of the relationship between the results of chemical analyses of soil, plants and grain crop, it was possible to set up gradients of required nitrogen supplements for soil and plants; on this basis it could be established which winter wheat fields required spring addition of nitrogenous fertilizers. References 12: 8 Russian, 4 Western.
[1049-7813]

UDC 631.67.03:631.81.033:546.42

EFFECT OF QUALITY OF IRRIGATION WATER, REGIMEN AND METHOD OF IRRIGATION ON ACCUMULATION OF ^{89}Sr IN PLANTS

Moscow AGROKHIMIYA in Russian No 11, Nov 83 (manuscript received 29 Apr 82)
pp 96-100

MALIKOV, V. G., PEREPELYATNIKOV, G. P. and ALEKSAKHIN, R. M.

[Abstract] Effect of the quality of irrigation water (hydrochemical class, mineralization, composition of mineral salts) and the method of irrigation on the accumulation of ^{89}Sr was studied on winter wheat, corn, cabbage and lucerne. Four hydrochemical classes were studied: sulfate-sodium, chloride-sodium, hydrocarbonate-calcium and hydrocarbonate-sodium. They were shown to have a direct effect: ^{89}Sr accumulation in winter wheat was 3-6 times less when the sulphate-sodium water was used in a sprinkling system irrigation than with other hydrochemical classes. Increased mineral content in the water (from 150 to 1900 mg/l) also lowered absorption of

^{89}Sr by wheat grain (16-19 fold) or corn (1.4-2.0 fold). Sprinkling-irrigation facilitated ^{89}Sr entry into the overground phytomass more than the irrigation by furrows. An increase in the volume of water from 200 to 500 m³/hectare increased the introduction of ^{89}Sr into the plants studied by 12-100%. Further amounts of sprinkling water had no additional effect. The leaves contained 86% of the total radionuclide level; economically useful portion of the plant contained only 10%. References 4 Russian.
[1049-7813]

UDC 632.954

SEARCH FOR SYNERGISTS TO HERBICIDE PREPARATIONS. 1 COMMUNICATION.
POTENTIAL SYNERGISTS TO CARACHOL AND 2,4-D ACID

Moscow AGROKHIMIYA in Russian No 11, Nov 83 (manuscript received 20 Oct 82)
pp 101-105

LYAPKOVA, N. V., SEMENOV, V. A., BAZUNOVA, G. G., MIKHAYLOVA, G. V.,
DAVYDOV, A. M., ANTIPANOVA, V. Ye., NOVAK, N. V. and KAMYNINA, V. F.,
All Union Scientific Research Institute of Herbicides and Plant Growth
Regulators

[Abstract] Carachol is an anti-wild-oat preparation used on wheat fields and 2,4-D acid is one of the oldest and most widely applied herbicides. New preparations were sought which could exhibit synergistic action with above agents. The search was made in data banks starting with chemical structures of possible analogues and selected physical-chemical properties. Following agents were synthesized as possible synergists for carachol: N-4-ethoxyphenyl-valeramide, N-4-ethoxy-2-methylvaleramide, 4,4'-dinitrodiphenylurea, O-nitrophenol, 2,4-dichloro-6-nitroaniline, S-ethyl-N(3,4-dichlorophenyl)-[(1'-methyl-1'-carbobutoxy)methyl]-thiocarbamate and S-phenyl-N-3,4-dichlorophenyl-N-[(1'-methyl-1'-carbethoxy)methyl]-thiocarbamate; and for 2,4-D acid: the methyl ester of 3-(methoxycarbonylmethylthio)-propionic acid, butyl ester of S-(butoxycarbonylmethylthio)-propionic acid, butyl ester of butoxycarbonylthioacetic acid, butyl ester of carbamoylmethylthioacetic acid, ethyl ester of N-2,6-dichlorophenylthiocarbamic acid, tributylurea and 4-ethylthio-2,2,5-trichloro-4-cyclopenten-1,3-dione. Several of these agents gave some synergistic effect. Figures 1; references 28: 19 Russian (1 by Western authors). 9 Western.

[1049-7813]

STUDIES OF SOIL REGIONALIZATION AND PROBLEMS OF DETAILED SOIL-AGROCHEMICAL REGIONALIZATION OF NON-CHERNOZEM ZONE OF RSFSR

Moscow AGROKHIMIYA in Russian No 11, Nov 83 pp 106-116

LIPKINA, G. S.

[Abstract] Multiple studies carried out since 1940, when N. P. Karpinskiy carried out the first soil regionalization of turf-podzolic zone, exemplify the difficulties experienced in using existing natural-economic regionalization of the country in attempts to solve economic problems such as distribution of fertilizers. A review of various studies since 1940 was presented. It was concluded that soil-agrochemical regionalization of non-chernozem zone of RSFSR is one of the most important activities in soil cultivation and agrochemistry. Considerable accumulation of new data will make it possible to develop modern system of soil-agrochemical regionalization leading to new experiments designed to plan and evaluate effective use of fertilizers based on the soil characteristics of individual regions. With adequate number of experimental data, statistical methods could be applied to their analysis.

References 35 Russian.

[1049-7813]

UDC 632.95

ACHIEVEMENTS AND PROSPECTS FOR DEVELOPMENT OF ANALYSIS OF RESIDUAL QUANTITIES OF PESTICIDES IN MEMBER-COUNTRIES OF COUNCIL OF MUTUAL ECONOMIC ASSISTANCE

Moscow AGROKHIMIYA in Russian No 11, Nov 83 pp 117-135

KLISENKO, M. A., GIRENKO, D. B., PIS'MENNAYA, M. V. and NOVIKOVA, K. F.

[Abstract] The question of the effective and safe use of pesticides became an international issue concerned with the protection of human health and environment. One of the most important aspects of prophylactic measures is the determination of residual quantities of chemicals in the environment. A review of experimental results obtained through a number of analytical methods was reported. After discussing general aspects of the methods of concentration of pesticides and their extraction, the authors addressed various methods of their assay including thin layer chromatography, enzymic chromatography, gas chromatography, various photometric methods, UV spectrometry, polarography and kinetic methods of analysis. Faced with multiple components, a combination of methods must be used including computerized analyses of the data. Considerable attention was paid to halogenated pesticides, organophosphoric agents, triazines, dinitrophenols, dipyridyls, carbaminic acid derivatives and mercury organic pesticides. Recent interest in microbiologicals led to control measures for these agents. More attention needs to be paid to atmospheric contamination and analytical methods for multicomponent systems.

References 176: 130 Russian, 46 Western (1 by Russian author).

[1049-7813]

BIOTECHNOLOGY

BRIEFS

NEW ENZYME IN FISH TISSUE--The Pacific Institute of Bioorganic chemistry of the DVNTs [Far Eastern Sciences Center] of the USSR Academy of Sciences proposes an endoribonuclease obtained from waste products of the fish processing industry. The enzyme specifically splits, in the RNA molecule, the internucleotide phosphodiether bonds in the A, G and U, but not the C, nitrogen bases, and is analogous in specificity to the RNAase Phy I from *Physarum polycephalum*. The enzyme may be used for study of structure and purification of RNA, obtaining nucleotides and nucleosides from RNA and, also, as a medical preparation. It is produced in the form of a lyophilized dried powder which may be stored for a year. The price is 50 rubles per milligram. Applications for 1984-1985 should be sent to the following address: 690022 Vladivostok 22, Vladivostok Centenary Prospect 159, Pacific Institute of Bioorganic chemistry. [Text] [Moscow KHIMIYA I ZHIZN' in Russian No 4, Apr 84, p 40] [COPYRIGHT: Izdatel'stvo "Nauka", "Khimiya i zhizn'", 1984 (6)] 12344

UDC 582.282.23:579.[22+24]

EFFECT OF CYCLIC CHANGES IN CULTIVATION CONDITIONS OF GROWTH KINETICS AND
PHYSIOLOGICAL PROPERTIES OF YEASTS

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 6, Nov-Dec 83
(manuscript received 1 Sep 82) pp 909-916

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Microbiology, USSR Academy of Sciences, Moscow Order of Labor Red Banner
Institute of Chemical Machine Construction

[Abstract] The goal of this study was to evaluate nonstationary conditions created by rapid changes in pH and pO_2 during periodic cultivation of yeasts on their growth rate, economical coefficient and morphophysiological characteristics. The following yeasts were used: *Candida utilis*, *Saccharomyces cerevisiae* and *Candida scottii*. The nonstationary conditions represented pH changes ranging from 2.6 to 7.5, 4.5 to 7.5 and 4.5 to 2.6 as well as the reverse of each pair, within a short time interval (2 to 60 min); pO_2 was altered from the normally-required level to a practically anaerobic condition. The results of a number of experimental runs showed that cyclic changes in pH and pO_2 during the experimental growth period had no effect of a negative nature and, in fact, increased specific growth rate from 0.33 to 0.5-0.6 hrs^{-1} without lowering the economic coefficient. A hypothesis was discussed for the formation of intermediate products during the oxidation of yeasts and their use during aerobic stage of the cyclic regimens. A mathematical model was described for yeast growth in non-steady conditions which accounted for the formation of and utilization of possible intermediate biosynthetic products within the time intervals studied. Figures 6; references 4: 3 Russian (1 by Western author), 1 Western.
[613-7813]

PRODUCTION OF *SERRATIA MARCENSES* MUTANTS, SUPERPRODUCERS OF ENDONUCLEASE, BY
TREATMENT OF SYNCHRONIZED CULTURE WITH NITROSOMETHYLUREA

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 6, Nov-Dec 83
(manuscript received 4 Aug 82) pp 974-978

PANFILOVA, Z. I. and SALGANIK, R. I., Institute of Cytology and Genetics,
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[Abstract] Ability of chemical mutagens to induce mutations in *Serratia mar-*
censes, assuring increased production of endonuclease, was investigated. To
select the most effective mutagen, the activity of hydroxylamine (HA), di-
methylsulfate (DS) and nitrosomethylurea (NMU) was studied. Only the NMU
induced mutations in doses of 10-to-25 mM yielding clones with elevated endo-
nuclease activity. The most sensitive time for inducing mutants was a 15 min
period, 40 min after the beginning of the log growth phase, yielding a mutant
which synthesized 40-100 fold more endonuclease than the present strain. The
ability of *S. marcescens* endonuclease to hydrolyse RNA and DNA and to inhibit
reproduction of RNA- and DNA-containing viruses represents the important
practical value of such an enzyme. Figures 4; references 20: 14 Russian,
6 Western.
[613-7813]

ENVIRONMENT

UDC 57.04:547.912:631.46(479.24)

EFFECT OF PETROLEUM CONTAMINATION ON NITROGEN TURNOVER IN SOIL

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 6, Nov-Dec 83
(manuscript received 9 Jul 82) pp 1003-1006

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[Abstract] Currently, the environment is being polluted with technological organic substances including various petroleum products. Soil contamination with oil byproducts shifts ecological equilibrium of the biosystem. Effect of petroleum contamination on the activity of microorganisms facilitating nitrogen turnover in the soil was investigated. It was shown that nitrifying microorganisms are very sensitive to petroleum and their oxidation products, losing their activity rapidly in the presence of the latter. On the other hand, the quantity and activity of microorganisms participating in azotification, ammonification and denitrification processes was increased. Lowered activity of nitrification microorganisms led to a short-circuited turnover of nitrogen in oil-contaminated soil assuring a faster turnover. Figure 1; references 19: 6 Russian, 13 Western.
[613-7813]

UDC 550.72:556.115(285.2)

MICROBIOLOGICAL CHARACTERISTICS OF NATURAL OIL MANIFESTATION REGIONS IN LAKE BAYKAL

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 6, Nov-Dec 83
(manuscript received 5 Aug 82) pp 1021-1024

MAKSIMOV, V. N., MAKSIMOVA, E. A., RUDYKH, A. R. and KOLESNITSKAYA, G. N., Scientific Research Institute of Biology, Irkutsk

[Abstract] Existence of depth emanations of oil in several regions of Lake Baykal made it possible to study the activity of microbes in water and in soil of these regions. Depth emanations of organic substances from the rift zone of Baykal were determined in the tropo-ecological system of the lake. The content of various physiological groups of microorganisms and

their activity were determined. Analysis of microbial activity in bottom sediments near the Sukhaya river indicated the presence of sulfate-reducing microorganisms (6-260 cells per gram of wet soil and oil-oxidizing microorganisms of the genus *Mycobacterium*). Production of microbiocenoses in the examined bottom loci of natural oil emanation varied in a narrow range from 0.08 to 1.09 $\mu\text{g C}_{\text{org}}/\text{g}$ of dry soil. Hydrocarbons of natural deep-water origin did not increase the productivity of microbiocenoses of the water depth and bottom sediment in the immediate loci of their escape. Figure 1; references 6 (Russian).

[613-7813]

UDC 579.695:577.336

QUENCHING OF LUMINESCENCE OF LUMINESCENT BACTERIA AS TEST FOR TOXICITY OF PHENOLIC COMPONENTS OF SEWAGE

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 6, Nov-Dec 83
(manuscript received 19 May 82) pp 1014-1016

GIL', T. A., BALAYAN, A. E. and STOM, D. I., Scientific Research
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[Abstract] It was of interest to compare toxicity changes of quinone solutions mixed with phenols and sodium thiosulfate by the quenched luminescence of luminescent bacteria *Benckea harvey* mav, their dehydrogenase activity and by their ability to reproduce. It was established that the luminescence intensity was the most sensitive indicator for the presence of various phenolic compounds in the tested medium. The compounds examined in this series of tests could be arranged in the following order of diminishing toxicity: p-benzoquinone, hydroquinone, resorcin, monophenol. One negative aspect of this test was that the luminometer used had to be imported as none are made within the USSR. Figure 1; references 9: 7 Russian, 2 Western (1 by Russian author).

[613-7813]

FOOD TECHNOLOGY

MICROBIOLOGY AND FOOD PROGRAM

Moscow EKONOMICHESKAYA GAZETA in Russian No 51, Dec 83 pp 1-2

[Article prepared by the chemistry department of the USSR State Committee on Science and Technology, from "Ekonomicheskaya Gazeta", passages enclosed in slantlines printed in boldface]

[Text] An important role in the realization of our nation's Food Program belongs to microbiological industry. Resolutions of the 26th Party Congress have specified measures aimed at accelerating the development of production on the basis of microbiological synthesis. The output of necessary items in animal husbandry of commercial fodder microbiological protein and lysine and of other production is increasing significantly.

The progress of implementing the scientific-technical program for the development of progressive technologies and equipment for microbiological industry is discussed in this report prepared by the USSR State Committee on Science and Technology.

[Inset in square beside numbers] PRODUCTION OF FODDER MICROBIOLOGICAL PROTEIN (1000 tons of the marketable product).]

Pictured are an Angara Factory of protein-vitamin concentrates which operates and continues construction, and an experimental shop of the Lebanon Biochemical Factory in Latvian SSR--the leading enterprise of microbiological industry, which manufactures lysine and premixes. TASS photo.

Microbiological industry puts out a wide assortment of drugs which are utilized in various sectors of the economy. The largest consumer of its production is the agricultural-industrial complex, of which it is an important component.

One of the key problems resolved by the Food Program is the increase of production of animal husbandry. This is linked to reinforcing the fodder base with a more rational use of existing fodder resources, based on the improvement of their balance of protein and other components.

Sowing of grain, legume and olive crops is expanding and maximum involvement for the production of protein additives of fish, meat-dairy and the food industry waste products is guaranteed. However, as calculations show, all of

this will satisfy only two-thirds of agriculture's increasing need for protein additives. An alternative source of them, which is more tangible and reliable, is the further accelerated development of the microbiological industry.

The accepted resolution of the CPSU Central Committee and the USSR Council of Ministers, concerning further development of industry for producing protein and other fodder additives for needs of animal husbandry, plans for a broad program of scientific and experimental work in the field of biotechnology and the development of a raw material base for the production of fodder protein and the introduction of results of this work into industrial and agricultural production.

Fodder yeasts and protein-vitamin concentrates (PVC), which are put out by enterprises of the Main Microbiological Industry, contain approximately 60 percent total protein, which is one-third greater than in soybeans. Based on manufacturing processes developed in our country and on the foundation of national equipment, the largest specialized plants in the world have been built and are operating for production of fodder yeasts from wood raw material and protein-vitamin concentrates from liquid purified paraffins.

Microbiological fodder protein has gone through many years of medical-biological and zootechnical experiments in scientific research institutes and in many of our national farms and has been accepted for wide use in animal husbandry. The inclusion in pig and poultry rations of up to 25 percent of the protein additives raises the animals' weight increase 15-20 percent and causes a 20 percent improvement in the use of food substances.

The realization of new tasks in this industrial sector is possible due to the scientific technical program to "develop and introduce automated technological processes and equipment of increased unit capacity for production based on microbiological synthesis of fodder protein substances and amino acids for fodder and medical goals".

FROM DIFFERENT RAW MATERIAL

When cultivated in petroleum hydrocarbons, yeast cells accumulate a significant amount of lipids--substances which have a series of valuable properties. After corresponding processing, they can be used in the national economy, in particular for producing high quality sorts of toilet and household soap (triglyceride and free liquid acids), for medical industry needs (phospholipids), as lubricants, as reagents in the ore mining industry and in the varnish and paint industry (oleic, linoleic and linolenic acids). It is possible to also isolate biologically-active substances (ergosterol, ubiquinon) and others from the non-saponified fraction of the microbial oil. In this case, the lipid content reaches 20 percent of the cells' weight.

Another stage of the scientific-technical program specifies the creation in one of the PVC production plants of experimental-industrial equipment for extracting the lipid fraction from yeast and its reprocessing. The Main Microbiological Industry and contracting organizations must guarantee to finish construction at the planned times.

It should be mentioned that as a result of the complex reprocessing of micro-organism biomass, it is possible to obtain components of whole milk substitutes, fodder compositions for the young of agricultural animals and starter food for fish.

Liquid paraffins, removed from oil, are known to be used in petrochemistry and the production of consumer goods. A significant percentage of them also serves as raw material for biosynthesis processes.

The most important assignment of the scientific-technical program stipulates the development of a highly-automated manufacturing process and equipment for the production of PVC from highly purified liquid paraffins of oil with a closed cycle of water use. It specifies testing leading models of increased unit capacity for newly constructed plants: fermenters, separators, evaporating devices and granulators of powdered PVC.

/UNFORTUNATELY, THE MAIN MICROBIOLOGICAL INDUSTRY (DEPUTY CHIEF V. BORISOV) DID NOT ADOPT NECESSARY MEASURES TO ORGANIZE INSTALLATION OF A HIGH UNIT CAPACITY FERMENTER, WHICH WAS READY AS EARLY AS 1978, AND THE WORK OF SEVERAL COLLECTIVE STAFFS OF THE MINISTRY OF THE CHEMICAL AND PETROLEUM MACHINE BUILDING AND THE MAIN MICROBIOLOGICAL INDUSTRY REMAINED UNFINISHED. ADR-76 TYPE FERMENTERS, WHICH WERE ASSEMBLED IN MAIN MICROBIOLOGICAL INDUSTRY PLANTS, WITH A CAPACITY OF 50 TONS A DAY, DID NOT REACH THE PROJECTED LEVEL AND REQUIRE FINISHING CONSTRUCTION. THE MINISTRY OF CHEMICAL AND PETROLEUM MACHINE BUILDING (DEPUTY MINISTER P. GRIGOR'EV) SHOULD ACCELERATE THE DEVELOPMENT OF SEPARATORS OF LARGE UNIT CAPACITY, WHICH ARE NECESSARY FOR OPERATING AND PLANNED PLANTS./

Studies conducted by organizations of the Main Microbiological Industry, the USSR Ministry of Agriculture and the USSR Ministry of the Petroleum Refining and Petrochemical Industry have shown that the use, in production, of fodder yeasts of only plant types of raw material and purified liquid paraffins of oil is not sufficient. In the future, according to goals of the scientific-technical program, natural gas, synthetic ethanol and methanol will be involved along with these types of raw material. This will make it possible to completely satisfy the demand for fodder yeasts.

In conditions of our country, the use of natural gas (methane) for biosynthesis of protein promises especially tempting prospects. The original raw material is inexpensive enough. Its resources for the needs of microbiological industry are practically unlimited. The obtained bacterial mass contains more than 70 percent raw protein.

In accordance with the goal of the scientific-technical program, experimental-industrial equipment is being developed in the PVC Svetloyarsk plant. Well-planned output of a new fodder protein will begin as soon as next year. Data will be received for the technical-economical evaluation of industrial production and leading models of manufacturing equipment will be tested.

Another prospective type of raw material is methyl alcohol. The development planned by the program in the 11th Five-Year Plan of experimental-industrial production is of important significance. The good solubility of alcohol in water, the assimilation of methanol by microorganisms and the possibility of using both yeast and bacterial strains for biosynthesis make this process very attractive.

Ethyl alcohol not only possesses the same advantages as methanol. It also has its own merits. The biomass produced from cultivating yeasts is distinguished by its high quality, which makes it possible to also use it for food. Experimental-industrial equipment is also being developed in this direction. The creation of an automated manufacturing process will make it possible to obtain necessary data for technical-economical evaluation.

ESSENTIAL AMINO ACIDS

Animals essentially require the component parts of proteins--amino acids. Natural plant fodder contains 30-40 percent less of the essential amino acids than are required. This is why the problem of obtaining amino acids comes so close to the problem of obtaining protein. At the present, the microbiological process is the prevailing method. The most attention is given to lysine production. As specified by the scientific technical program, the Main Microbiological Industry and the Ministry of Chemical and Petroleum Machine Building are developing a manufacturing process and equipment for heightened unit capacity for production of fodder crystalline lysine from melassic and acetic acid on an industrial scale.

/LYSINE IS USED AS A FOOD ADDITIVE FOR FATTENING PIGS, POULTRY AND THE YOUNG OF CATTLE. THE NEED FOR THIS AMINO ACID (IN RELATION TO ADULT GROUPS OF ANIMALS) AMOUNTS, ON AN AVERAGE, TO 0.1-0.4 PERCENT OF THE RATION./

The application of lysine in raising and fattening animals, pigs for example, as an additive, has shown that consumption of fodder protein can be reduced 20-25 percent and the productivity of animals can be increased 13 percent. Raising young birds on rations which have been enriched with this amino acid reflects favorably on their subsequent productivity. Considerably less grain is required for mixed feed.

The enrichment of mixed feed with lysine has shown that in industrial production, the preparation form should provide for minimum expenditure of manual labor. Highly concentrated forms keep better and their production is more efficient.

BETTER MODEL LEVELS

In the course of the realization of this program, good results have been attained in working out the manufacturing process on an industrial scale rising acetic acid as a substrate. Effective manufacturing processes, which make it possible to raise the level of lysine accumulation in the biosynthesis process and to reduce expenditure of basic raw material for a ton of production are being introduced to enterprises. Methods of gene engineering have constructed a highly active plasmid strain--a producer of a growth factor--of

homoserine, which also makes it possible to raise the level of lysine accumulation.

/MANUFACTURING LINES WITH ASUTP [expansion unknown] ARE BEING DEVELOPED. LYSINE IS KNOWN TO BE MANUFACTURED IN MANY COUNTRIES. WHEN INTRODUCING PROGRESSIVE MANUFACTURING PROCESSES, IT IS NECESSARY TO UTILIZE WORLD EXPERIENCE MORE EFFECTIVELY./

Scientists of our nation and research in other countries, have shown the effectiveness of using other amino acids as well, which are vital for agricultural animals: methionine, tryptophan, threonine, arginine, agutamic acid and others. However, their large-tonnage production is not yet in existence. The reason for this is the, as yet low, economical effectiveness of biosynthesis processes.

These tasks must be resolved by our science and industry before the end of the 11th and in the 12th Five-Year Plan. It is necessary to accomplish a significant volume of research on the selection of microorganisms and to introduce new highly-productive strains in producing fodder protein, amino acids and other preparations from microbial synthesis.

Of definite interest are bacteria capable of growing due to use of hydrogen, oxygen, carbon dioxide and a number of mineral components. A basic product of the metabolism of such oxyhydrogenating microorganisms is water. The cellular biomass contains up to 70 percent protein, rich in amino acid composition.

The problems being resolved in this scientific-technical program are quite complex. The successful execution of this group of tasks facing those involved, primarily the Main Microbiological Industry, will exert a great national economic effect, and it is necessary to apply many efforts to their timely completion.

12473

CSO: 8144/1430

MARITIME KRAY FLOATING FISHERY BASE

Moscow IZVESTIYA in Russian 25 Mar 84 p 2

[Article by A. Pushkar', IZVESTIYA correspondent, Maritime Fishing Expedition]

[Text] For a long time I had wanted to delve into the essence of the term, floating base, and now the opportunity has presented itself. The vessel, Postyshev, is entering Zolotoy Rog Bay at the lowest speed, as if afraid of disturbing someone. It is a remarkable factory ship that has pleased the Dal'moreprodukt [Far East Marine Products] Administration for 20 years already with its work achievements, and it is also known as the "molder of personnel."

"Do you know what sort of girls work for us? How swift their fingers are!" said the energetic Nina Vasil'yevna Yermolayeva, head of the chemistry laboratory, i.e., the guardian of quality, who first boarded Postyshev 17 years ago.

... Although work at sea was considered the lot of men since time immemorial, our Ministry of the Fish Industry broke with tradition. The factory ship, like a floating base [or mother ship], is an enterprise that uses the labor of women, aboard which 100 to 300 "girls," as the workers there are called, regardless of their age, the average being 19-30 years, live and work. Or else, they are called sailor-processors, as listed on the rolls.

The production shop is a room loaded with iron: transporters and pipes, cutting and stacking conveyers, rolling lathes and autoclaves. Everything vibrates and makes a noise, drowning out human speech, and the little jars [or cans] that move endlessly in all directions clicking and tinkling, like a cavalry, as if a background and accompaniment.

"Now we are at the end of our voyage, everything is black and rusty," Nina Vasil'yevna tells us. "But when we take off in the spring to fish for crab, everything is painted, the ceilings shine and our girls stand white as sea-gulls in their coats."

[Question] For how many hours per day?

[Answer] Eleven, but sometimes it is more.

I try to imagine how one can stand for such a long time.... Yes, it is hard for the newcomers. The experienced ones suggest that the feet should be crossed, like when dancing. Or else, place the heel of the right foot on the toe of the left, then the reverse.

According to production conditions, temperature in the shop does not exceed 15°. The fan blows cold air, and water flows beyond the deck. Gathering to start their shift, the girls dress warmly, and wrap their legs in legwarmers so as not to get a chill in the rubber boots. Vladimir Il'ich, Nina Vasil'yevna's husband, also an old hand aboard Postyshev and a former motorboat fisherman, told me that once friends visited the fleet from the Ministry, and brought samples of special gear from some institute; it was wrinkleproof and friction-free, just a pleasure! But things remained as before. Still the same quilted jackets, boots only in size 40 or larger and overalls that shrink a few sizes after laundering. The gloves get torn before their time.

At 0700 hours the ship's public address system, which could raise the dead, wakes the girls and they get breakfast. The shift starts at 0800 hours. Lunch is at 1200, teatime at 1600 and at 2000 hours they take off their overalls, unwind the legwarmers and, after waiting in turn, they take a shower and try to recover under its burning spray. They have dinner and watch a movie. Then to sleep. And that is the way it is, from sunrise to sunset. Then comes the time to gulp down large cups of coffee and start the night shift. Then we have the reverse, from sundown to sunrise.

The girls had been at sea for 6 months. Now it is the end of the voyage. There is the shore that they dreamed about so often, the beautiful city hugging the bay. But, strangely, the ship was full of people and none, with rare exception, was rushing home.

"Where do you live?" I asked Nina Vasil'yevna.

"Here is our home," said her husband, putting his hand with a gold ring on his finger on the cabin table.

Their son is in Astrakhan, at his grandmother's. Nina Vasil'yevna did not sail for 6 years because of him, until he started school. Now Sasha is in eighth grade. He writes letters, sends drawings and school reports, he is a well-behaved boy. How often do they see each other? Usually every 2 years, and in the summer when the factory ship is being overhauled.

"It is all a matter of getting an apartment," Vladimir Il'ich continues nervously. "We are not even dreaming of a state-supplied one. We have some savings gathered through heavy labor at sea, if only they would give us a coop apartment, we are prepared to pay, just to have our own home and our son with us...."

Nor is there a place for the seamen to go in Vladivostok, for, as they say, Dal'moreprodukt has neither house nor home, and the recreation building to be used between voyages, for which the foundation was laid 14 years ago, is still at the zero-cycle stage.

... At this time, sailor-processor Valentina Maksimova was being paged over the ship's public address system. And she arrived, carefully groomed, as if for a holiday, a nice young woman speaking with a Belorussian accent, gurgling like a brook over pebbles. She arrived here 6 years ago through organized recruitment; a year later she married a fellow from the same factory ship. Postyshev became a home for them. But there is one little shadow.... This time she was not simply going ashore, she was going to the hospital. Valya does not know what is wrong with her; it may be that, at the speed she works, she caught a chill at the conveyer. But it was learned that she does have a health problem and, perhaps, she will have to undergo surgery in order to have children.

But Nina Gromosheva had no problems at all. She is from Moscow. She had worked in the Podarki shop on Lenin Avenue and suddenly signed up for 6 months, out of interest in finding out what it was all about in the Far East. When she returned home, she longed to return. And every since she has not missed a single voyage. Her only close ones are her aged mother in Moscow and this factory ship, which is not new either.

I wondered what kept her here, but never worked it out until Nina herself told me, laughing.... Of course, the money is attractive, there is enough to get this and that. But this is not what it is all about. After all, she lives with all expenses paid. They'll wake her up to go to work. They'll call her for breakfast and lunch. The bed linens will be changed. She will finish her 11 hours of work and go to sleep. She has both a cabin, and there are movies every day. She never has to walk or travel anywhere, fight the crowd in buses, stand in line at shops, stand over a stove, peel potatoes, worry about a thousand trivial things, which are the lot of women on shore.

I told about my encounters with the "old" ones. But most of the processor-sailors are "new." Postyshev takes on many young girls, unmarried women and young married couples each spring; some are there for a "purpose," i.e., to earn enough for an apartment, furniture, car; others are women who are not married and hope to find their life's companion here, in this distant land, while others came, "just to look around."

... V. Chulanov, deputy commander for political affairs, and I enter the cabins, and meet the "new ones." There were among them city girls, with bold eyes, long-legged and slender, and there are also simple girls from Chuvashia, who are particularly wanted at the floating bases. All these young beauties, who are priceless on city and village streets, in parks, on beaches, in the theater seem to be somewhat unnatural here, in an iron box. It is not in vain that any fellow would pass here, even the puniest, strutting like a king, carelessly bumping the girls with his shoulder.

These single women besieged the Postyshev like a hurricane. It could not help but blow the caps off the commanders of Dal'moreprodukt.

The four-story administration office was filled with sturdy men, like the factory ship was filled with girls. They were conducting radio communications with the Pacific Ocean itself, they issued commands on when and where the factory ships were to go, they counted the thousands and millions of conventional cans, and my questions appeared strange to them.

"I'm not a gynecologist!" V. Azarkin, first deputy chief of the administration, snapped with indignation, when I asked how the marine work affects the health of women.

"Protection of motherhood?" Z. Zabora, chairman of the trade-union committee, stammered in surprise. "Our girls protect themselves."

Zakhariy Andreyevich has the gift of gab but apparently he has never mastered entirely the substance of his trade-union duty, although he has held this worrisome position for many years, since he could not answer my questions about how the fish-processors dress when they start on a shift, whether their work clothes are good and the conveyer is convenient....

Most of those at the helm of Dal'moreprodukt are seamen. They had been captains of the floating base, technologists, mechanics. They had arrived recently to their administrative positions. They are relatively young and educated people; they have gone through the rigorous school of maritime labor. Having become accustomed to weather storms and take chances, without sparing themselves, and finding themselves commanders of an entire army of more delicate beings, it seemed to me that they did not single out women as they are destined to be, as is done in our textile, sewing and food enterprises.

Perhaps this is why the chiefs of this office did not conceive of its existence without feminine fingers, which have been recognized, as a result of more than 50 years of research, as the most perfect mechanism in the canning industry. This is the orientation of GOST's which were developed in the reign of manual labor, when we produced much less canned goods.

Yet, there are the IRA and INA machines for cutting and packing fish in cans, which reduce to one-third the number of workers. "Hm...yes, we do have 'little Ira's' and 'little Ina's,' as the seafaring girls call them," they tell me, "but they are put out in Kaliningrad at an experimental plant, in very small number, and the ministry allocates them literally one at a time. Last year, all of Dal'ryba [Far East Fisheries] received 27 of them, yet Dal'moreprodukt alone needs 90 per year."

Oh my, the problem with this fish-processing equipment! I recalled that one of my first publications in IZVESTIYA was a report on "Why Fish Are Short." It was concerned with an effort to start up series production of a domestic fileting machine. That was 20 years ago, and there is still no "filet" equipment. Whenever I visit floating bases and factory ships, I always see the same shaking and groaning huge machines, which do not know how or are not properly adjusted, excessively overloaded, do not wish to properly roll, weigh and label the cans, break and dent cans, and, considering themselves to be machines, still require numerous people over them as back-ups or inspectors.

It appears to me that the problem is that the administrators in this sector, which does not have its own plants, never even seriously considered mechanization of fish processing. Without their own specialists in automation, electric engineering and robotry, the fish workers do not even seek contact with them. Yet there is an Institute of Automation and Control Processes in Vladivostok.

There are also specialists nearby who, unlike management of the Ministry of the Fish Industry, believe that to scale and pack fish by hand is tantamount to using a sickle to harvest grain in our times, and that automated fish factories are not the invention of dreamers. I am referring, first of all, to Valentin Valentinovich Sobchenko, candidate of sciences, who graduated from the local polytechnical institute. I recall that, about 10 years ago, he was part of a group of similar young scientists specializing in automation and electronics and, out of pure enthusiasm or, perhaps, out of pity for the girls in oilcloth aprons, he designed a fish-cutting machine. It would cut off the heads and rip open the bellies.

It was abandoned, and not because nothing came of the project. There is no adequate experimental and production base, but mainly no interest on the part of a sector that, it would seem, should have been interested. I recalled Sobchenko's bitter words: "What more is there to say, when even the minimal automatic equipment installed aboard new floating bases breaks down and is not functional." It turns out that the existing situation is satisfactory to everyone. From top to bottom, the sector is not psychologically ready for automation.

And now, knowing about all this, I hear the news that the ministry is ordering new fish factories to be manned by 600 people, rather than 500 (we are growing, friends, we are growing!) and they are planned, as before, for seasonal workers.

"They are compensated for all this! Where else could a girl without any qualifications earn 500-600 rubles per month?" remarked Azarkin angrily.

It is true, money is not spared for manual labor. I talked with a young woman from the Ukraine who parted with her child 4 years ago and last summer cut up a ton of pilchard per day, and earned 1300 rubles/month from June to November. While I give credit to this woman for her physical and moral endurance, I am convinced that her work, which consists of using a knife to cut off the head and tail of the fish or pack it into cans, is not worth it in itself. Is the work of a milkmaid, who also manages to keep house and rear children, less valuable and important to the state? Where did such a contrast in wages come from? Oh yes: it is compensation for overworking, for the conditions at sea, for being separated from home, for ... the tears of the son left behind who misses his mother? And what should one call such a mother?

... No, preserve us from such compensation, was the thought in listening to the arguments of management of Dal'moreprodukt.

But there is something I cannot comprehend: while money is not spared for manual labor, specialists are not favored. Any fish worker earns more than a technologist, electrician, refrigerator mechanic or people who service the technological equipment of the floating bases. This is what led to a shortage of specialists, particularly men. The electricians are running. Equipment adjusters are not trained anywhere, while the qualifications of the mechanics at the plants are rather questionable, and they are in great demand.

Here is the answer to the question of why machinery functions poorly. Unlike the unfailing and meek Valya's and Nadya's, the little iron "Ira's" and "Ina's," and other machinery is capricious and stern. They need the shore with a good technical base and ship-overhauling plants, of which there is such a shortage in the Far East.

After lengthy vacillation, 15 years ago the Ministry of the Fish Industry made a seemingly impossible decision: to forbid the use of female labor aboard small and medium-sized fishing boats, where they worked as cooks, food servers and cleaning women. And nothing terrible happened: the ships did not sink without women and the catches did not diminish. In theory, as maintained by Sobchenko and other experts in the matter, we have the technical capabilities to mechanize and automate, or use robots in the production shops of the floating bases, and instead of hundreds of women to take 40-50 men that are highly qualified engineers and mechanics, adjusters and operators on the voyages. They are the ones that should be given high wages, good apartments with a view of the sea, where their wives would wait for them while doing work on shore that is consistent with their capacities.

"We even have captains without apartments!" counter the administrators of Dal'moreprodukt....

Here we come to what is the most important. The fishing industry was and still is a leading sector of the economy in the Far East. Because of it, villages were laid out on the Pacific coast and cities grew. However, expressly this agency has presently become the object of constant criticism in Party and soviet bodies, in the press of krays and oblasts of the Far East region. In the last decades, having set a course toward large-scale fishing, the fishing industry has increased its output considerably, in particular, that of canned goods. The Pacific fish factory provides a considerable part of the All-Union catch.

But the medal that we are ready to pin to the chest of the agency also has a reverse side. As it builds up the capacity of the fishing and fish-processing fleet, the Ministry of the Fish Industry has stopped thinking about its shore base to a proportionate extent, about the ports, ship repairs and, what is particularly inadmissible, about construction of housing, providing good social and living conditions for fishermen, acquiring personnel on all levels, including fish processors. The economically warranted and profoundly human Party principle of combined socioeconomic development, which is particularly important to the Far East, was disregarded in the leading industry of the region, against logic. And now that it is considerably behind other sectors, it has, so to speak, run aground. Here, on the floating bases and in the ports there is the lowest extent of mechanization of labor, and here there are the longest lines for housing, the greatest turnover of personnel.

Having become accustomed to organized recruitment since the 1930's, the management of fish factories of the Ministry of the Fish Industry continue, even now, to win over personnel from "someone else's nest," with all sorts of true and false inducements, although the State Committee for Labor has reduced such recruitment; they have sought recruits from cities of the Ukraine, sovkhoses and kolkhozes in the Volga region, etc. The personnel department of Dal'moreprodukt has assigned a special unit for this work. And, as in the olden days, 5000 seasonal women workers are taken here and there year in and year out. And both the regular and self-appointed recruiters, without a twinge of conscience, promise both big wages and apartments, and marriage. And the girls leave home, their job, lose their qualifications and circle of male

friends. Gone are the days when echelons of young women traveled to the Far East, and clean-shaven lads wearing side-fastened shirts greeted them at the stations, picked them up and carried them directly to the civil registry office and then to their tents. Since that time, cities and villages have been erected, the number of men and women evened up and, alas, there are no more available bridegrooms.

Why is it that expressly the 19-year old women are the ones who come? At that age, girls become bolder," explain the half-baked sociologists from Dal'moreprodukt. Those who have been unlucky in love, who failed in their tests, who wanted their freedom.... And this is how the personnel policies of a large enterprise are constructed, on the basis of personal failures, of "bare" material interests. It is simpler to bring people in than to build homes for them or automate production. Money is not spared for transporting them in and out, but then there are no worries: no apartment has to be provided, having installed people in ship cabins in essence with fictitious registration using the address of the enterprise, no nursery schools are needed, or schools, or stadiums, recreation bases or preventoriums, or cultural centers and all that man lives by today.

Specialists in the fish industry have nothing good to say about the man who previously headed this industry for many years. They have nothing good to say about his development of an enormous fleet in an empty space, having given birth to a "son" such as Dal'moreprodukt, without any offspring on shore. Of course he had good intentions: to provide the nation with much cheap production without building anything, without plowing or sowing. But then, everything turned around, expenses went up, and yet even Pushkin taught us in his story: the priest should not have been so anxious to cut costs. But is it only one person who is guilty for the troubles of an entire industry? Let us consider the same Dal'moreprodukt. After all, none of its former or current administrators, fearless people at sea, pounded a fist on the desk in their own ministry, none protested or said that this was the prior state of our economy, that it is shameful to work and live like this in our times.

I think that the decisions of the December and February plenums of the CPSU Central Committee and the pre-election speech of Comrade K. U. Chernenko, in which he keenly raised the question of the slowness with which the share of heavy and unskilled labor is diminishing in a number of sectors of the economy, that it is imperative to update them on the basis of current achievements of science and technology, have a direct bearing on the fish industry.... And the current administrators of this sector will finally move from the many years of marking time to an alliance with science and machine building, to decisive action toward integrated mechanization and automation of production.

Let the fishing industry enterprises send off to sea the iron maidens called IRA and INA, and robots as bridegrooms for them. While our dear girls should find a job after their own heart; let them celebrate the springs of their love on their beloved terra firma and rejoice at the beating of a new life under their hearts.

From the editorial office: Some important socioeconomic problems, intertwined with ethical ones, have been raised in the article by our Far East correspondent. It proves, once more, how this is

interrelated: organization of production, acceleration of technological progress on the one hand, and the social and domestic sphere, providing a favorable climate at work, on the other.

No doubt, the industry in question has considerable achievements to its credit. But this article reminds us, once more, that the question of the price of success remains of paramount importance in our country. And, for this reason, it would be interesting to find out what steps are being taken and planned at the present time by the USSR Ministry of the Fish Industry to improve organization of production and its equipment, as well as to improve social and living conditions for workers.

10,657

CSO: 1840/598

GENETICS

UDC: 577.21

GENETIC ENGINEERING

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 4-6

BAYEV, A. A., academician, Institute of Molecular Biology, USSR Academy
of Sciences, Institute of Biochemistry and Physiology of Microorganisms,
USSR Academy of Sciences

[Abstract] Genetic engineering can be defined as in vitro construction of functionally active genetic structures (recombinant DNA), or the creation of artificial genetic programs. Techniques used in genetic engineering are briefly described in this paper. Genetic engineering is frequently spoken of as the next biological revolution. Though not as revolutionary as the studies of Darwin or the identification of DNA as the carrier of genetic information, genetic engineering has allowed deeper understanding of the nature of functioning of the genetic apparatus. It has opened a broad path to studies which can eventually lead to revolutionary transformations of our ideas of heredity. Articles in this issue of the Mendeleyev Chemical Society Journal discuss the status of applied developments in the Soviet Union in this field. Figure 1; references 11: 6 Russian, 5 Western.
[616-6508]

UDC: 575.113.1:577.21

ROLE OF GENETICS IN DEVELOPMENT OF GENETIC ENGINEERING

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 7-12

ALIKHANYAN, S. I., professor, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, and MINDLIN, S. Z., doctor of biological sciences, Institute of Molecular Genetics, USSR Academy of Sciences

[Abstract] The authors indicate that the achievements of modern molecular genetics of microorganisms and the discovery of its ideals and methods

represent the basic content of genetic engineering. A history of the genetics of microorganisms as a science since the 1940's is presented. Emphasis is given to the scientific and theoretical basis of genetic engineering as opposed to the strictly technological aspects of the science. The achievements of molecular genetics based on the genetics of microorganisms are particularly significant. The utilization of microorganisms and objects of genetic research, extending the principles of genetic analysis to their study, has played a decisive role in the development of molecular genetics and therefore of genetic engineering. The prototype of experiments on manipulation of genes in vitro also developed within bacterial genetics, which has long studied the movement of genes both within a single genome and between different genomes in the creation of hybrid DNA molecules. Figures 7; references 22: 7 Russian, 15 Western.
[616-6508]

UDC: 577.155

RESTRICTION ENDONUCLEASES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 13-18

YANULAYTIS, A. A., candidate of biological sciences, All-Union Scientific Research Institute of Applied Enzymology

[Abstract] The restrictases were the enzymes which first made possible specific splitting of DNA into strictly defined fragments with dimensions suitable for preparative segregation and analysis. The history of the discovery and classification of restrictases (restriction endonucleases or endodeoxyribonucleases) is briefly outlined. Restriction enzyme nomenclature is discussed and the specificity characteristics of restrictases are noted. The study of restriction endonucleases, though great achievements have been made, is still in its very early stages. New manifestations of specificity such as the capability to break a phosphodiester bond between nucleotides, the capability of splitting DNA on both sides of a sequence and sensitivity to methylation of cytosine at the N⁴ position of the pyrimidine ring, have just been discovered. The number of new restrictases is growing rapidly. Major efforts are being expended in the search for and identification of the specificity of new enzymes, without the requisite deep study of these enzymes. The problem of the biological function of restrictase has not been solved. References 38: 4 Russian, 34 Western.
[616-6508]

PROCARYOTE VECTORS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 19-22

TANYASHIN, V. I., candidate of biological sciences, Institute of Biochemistry
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[Abstract] Vectors are DNA molecules capable of transferring foreign DNA into a cell and supporting there its reproduction or perhaps integration into the genome. Plasmids of bacteria and bacteriophages are the most frequently used vectors. The properties required of a DNA vector molecule are listed. The most important component of a vector is its replicon, the element which determines autonomous reproduction of the vector in the host cell. To produce a plasmid vector, a replicon must be united with genes permitting selection. Plasmid and bacteriophage-based vectors are described. A table summarizes the most important cases of utilization of various procaryote vectors. Figures 4; references 21: 3 Russian, 18 Western.
[616-6508]

UDC: 575.1

VECTORS AND GENETIC TRANSFORMATION OF ANIMAL CELLS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 23-27

BENDUKIDZE, K. A., Institute of Biochemistry and Physiology of Microorganisms,
USSR Academy of Sciences and FODOR, I. I., candidate of biological sciences,
Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of
Sciences

[Abstract] Systems of genetic transformation of animal cells and their contribution to the study of the hereditary apparatus of cells and in medicine are analyzed. The use of OB40, the first viral infecter, increases the number of genes introduced to 100,000 or more molecules per cell. The possibility is analyzed of using retroviruses for genetic engineering purposes. Nonvector genetic transformation of animal cells is achieved by introducing DNA into the cells by direct mitroinjection or more frequently by the CaP method. New vector systems have been designed in recent years and new universal methods of genetic cell transformation have come into use. The development of selective markers is reported, as well as work on the expression of the galactikase gene of E. coli in animal cells under the control of OB40 virus nucleotide sequences. The method described for genetic transformation of the cells of higher eucaryotic organisms with recombinant DNA are promising for both fundamental and applied studies. Data from studies in the field assist in identifying the nature of the

more than 2000 human hereditary diseases and developing approaches to their treatment. References 21: 1 Russian, 20 Western.
[616-6508]

UDC: 577.1

SUCCESSSES IN STUDY OF EUCARYOTE GENE TRANSCRIPTION

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 28-32

RUBTSOV, P. M., candidate of biological sciences, Institute of Molecular
Biology, USSR Academy of Sciences

[Abstract] Successes in molecular biology and molecular bacterial genetics over the past 20 years have led to clarification of the molecular mechanisms of expression of procaryotic genes. Successes of genetic engineering have allowed cloning of eucaryotic genes and study of their structure, opening the path toward determination of regulatory sections similar to the promoters of bacteria. Over the past 5 years it has been learned that the promoters of three forms of RNA polymerase differ significantly in their structure. Effective methods have been developed for constructing mutant gene forms in vitro and model systems have been developed for rapid testing of the transcription activity of mutant eucaryotic genes. The results obtained are briefly summarized. Gene promoters transcribed by RNA polymerase I-III are described. Figures 2; references 107 (Western).
[616-6508]

UDC: 577.21

GENETIC ENGINEERING OF HIGHER ANIMALS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 33-37

GORODETSKIY, S. I., candidate of medical sciences, Institute of General
Genetics, USSR Academy of Sciences

[Abstract] The systematic study of active genes in higher animals was begun in the 1970's. The separation of individual genes has overcome the first difficulty, the heterogeneity of the information introduced. Transformation by introduction of DNA to cells has helped to overcome the second difficulty, creation of systems capable of introducing and maintaining foreign genes in an organism. Several individual examples are used to analyze various approaches used to introduce genetic information to the cells of animal organisms, including introduction of genes to embryonal cells and introduction of genes to somatic cells of animals. Examples from American

practice are reported of microinjection of DNA solutions containing a thymidine kinase virus gene into mouse egg cells and the first successful attempt at introducing a functionally-active gene into an animal organism by Ca^{2+} microprecipitation of DNA. The examples studied as yet demonstrate only possible approaches to gene therapy. The problem of introducing genes to an organism has now gone beyond the stage of theoretical studies into the stage of active search for possible methods of practical application of the achievements of genetic engineering. Figure 1; references 17: 3 Russian, 14 Western.
[616-6508]

UDC: 575.113+577.21

GENETIC ENGINEERING OF HIGHER PLANTS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 37-40

VINETSKIY, Yu. P., professor, All-Union Scientific Research Institute of Genetics

[Abstract] Genetic engineering, a method of creating and transferring new genes, seems most suitable for use as a nontraditional method in the selection of agricultural crops. The transformation of plant cells in experiments in the USA is compared with the transformation of plant cells in nature. Recent works on the development of plasmid vectors and other aspects of modern molecular genetics have created a basis for practical utilization of genetic engineering in agriculture. It will be some time before genetic engineering can be practically utilized in selection, still longer before the creation of new plant species is a reality. Genetic engineering for the near future will limit itself to solution of relative simple problems such as introduction of genes determining resistance to herbicides. Figure 1; references 25 (Western).
[616-6508]

UDC: 575.1

EUCARYOTE GENOME STRUCTURE

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 41-47

KISELEV, L. L., professor, doctor of biological sciences, Institute of Molecular Biology, USSR Academy of Sciences

[Abstract] In the eucaryote genome there are unique and repeating genes. The eucaryote genome also contains large numbers of short and even longer repeating nucleotide sequences, many of which can move along the genome.

Among the repeating sequences are the so-called satellite DNA, the content of which varies in different animals from 1 to 75%. Satellite DNA includes repeated sequences 100 or more nucleotide pairs in length; clusters of shorter sequences; and very short sequences, just 2 to 15 pairs, repeated in tandem thousand of times with identical structure. The use of recombinant DNA molecule techniques has produced results which could not in principle be produced by any other method. Future utilization of this universal and promising approach will doubtless yield new discoveries in the future. The full chemical structure not only of the most important genes but also of gene ensembles with lengths of hundreds of thousands of nucleotides will be learned. Projects for decoding the full structure of individual chromosomes are seriously discussed. It is now possible to determine the position of any gene on the chromosome. The general principles of structural organization and individual differences between genes of a single organism, between genomes of different organisms, and between identical genes of different species, will become much clearer. Figures 6; references 62: 10 Russian, 52 Western.
[616-6508]

UDC: 577.21:595.773.4

JUMPING IN ANIMAL CELL GENES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 47-50

GEORGIYEV, G. P., corresponding member, USSR Academy of Sciences (AS), chief, Laboratory of Biosynthesis of Nucleic Acids, Institute of Molecular Biology, USSR AS

[Abstract] As early as 1977 it was established that genes in the chromosomes of *D. melanogaster* were markedly different positions in many cases even in individuals of the same line. The genes in question came to be called mobile dispersed genes or jumping genes. Six jumping genes have been isolated and studied, three in great detail. There are some 20 families of jumping genes. The properties of these segments are briefly discussed. They vary in size from 5 to 10,000 base pairs, the number of genes in each family varying from a few to 100-200. They total about 5% of the genetic material of *D. melanogaster*. They are surrounded by long terminal repeaters of identical structure regardless of their location. These repeaters contain sequences which correspond to the signals for beginning of transcription and polyadenylation of RNA. It is concluded that although these elements carry no useful information, not coding necessary cell proteins, they have a deep influence on the operation of the cell. It is particularly important that the mobile elements include many different signal sequences. Their movement greatly accelerates evolution. They may also result in disruption of normal cell processes, particularly in the development of cancer. References 37: 2 Russian, 35 Western.
[616-6508]

STRUCTURE OF CHROMATIN

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 51-55

PREOBRAZHenskAYA, O. V., Institute of Molecular Biology, USSR Academy of Sciences, KARPOV, V. L., candidate of biological sciences, Institute of Molecular Biology, USSR Academy of Sciences and MIRZABEKOV, A. D., corresponding member, USSR Academy of Sciences, Institute of Molecular Biology, USSR Academy of Sciences

[Abstract] The major components of chromatin are DNA, proteins and synthesized RNA. DNA is present in the dextro-rotated B form with approximately 10 pairs of bases per turn. A small quantity of levo-rotated Z form DNA is also present. The major protein components of chromatin are histones. Effective placement of DNA in chromatin and metaphase chromosomes is achieved by compacting the DNA at several levels. In chromatin the inactive DNA is in a very compact state and is hardly accessible for interaction with regulator proteins or enzymes. The major features of the structure of chromatin at several levels of its organization have been established in recent years, beginning with the nucleosome and extending through the domain level. The successes achieved allow us to approach the next, very interesting stage of research: determination of the significance of the structure of chromatin in its functioning and regulation of such processes as transcription, replication, repair and restructuring of genetic material in the cell, and determination of the mechanism of condensation of chromatin in the chromosomes. Figures 2; references 43: 2 Russian, 41 Western.
[616-6508]

UDC: 577.1

STRATEGIES FOR DETERMINATION OF PRIMARY STRUCTURE OF DNA

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 55-59

KRAYEV, A. S., candidate of biological sciences, Institute of Molecular Biology, USSR Academy of Sciences

[Abstract] The development of methods of recombinant DNA molecules has allowed production of purified DNA segments and stimulated the development of new approaches to determination of the primary structure (sequenation) of DNA, establishment of the sequence of nucleotide segments in its molecule. New methods of sequenation allow a single experiment to determine a continuous sequence of up to 500 nucleotides. The initial form of DNA to which sequenation is applied is in most cases recombinant plasmid DNA. The basic methods of sequenation are chemical degradation and polymerase copying using terminating nucleotide analogs. Strategies based on the

production of blocks with restriction endonuclease become increasingly difficult with increasing dimensions of the sequence studied. Strategies utilizing cloning have a number of obvious advantages over other fractionation methods. Both types of strategies are briefly described. Cloning strategies require sets of standard reagents for biochemical cloning and sequencing operations, computer programs and banks of nucleotide sequences to be used in the stage of processing the sequences produced. Figures 6; references 15: 1 Russian, 14 Western.
[616-6508]

UDC: 577.21

GENETIC ENGINEERING AND NEW METHODS FOR STUDYING PROTEINS AND NUCLEIC ACIDS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 60-63

KIRPICHNIKOV, M. P., candidate of physical and mathematical sciences,
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[Abstract] Most of the precise functional specifics of protein, nucleic acids and protein-nucleic complexes are related primarily to their spatial organization and dynamics. Whereas over the past 20 to 25 years the only method which could be used to determine detailed structural information at the atomic level was x-ray structural analysis, in recent years the successes of NMR spectroscopy have radically expanded our ability to study the structure and dynamics of biopolymers. In the past decade, gene engineering technology has been developed to a level such that it has become possible in principle to clone the gene of any protein of interest to us, in order to produce a sufficient quantity to apply NMR and x-ray structural methods. The modern study of the specific interaction of proteins with DNA is used to demonstrate the revolutionizing influence of gene engineering technology, radically changing the situation in this area of study. The latest achievements in chemical synthesis of deoxyoligonucleotides and directed mutagenesis have created practically unlimited capabilities for modification of the nucleotide sequence of genes and regulatory DNA sectors. Reports have recently been published on successful practical application of oligonucleotide-directed mutagenesis. The possibility of modifying genes and chemical synthesis have thus made it realistic to produce proteins which do not exist in nature. A natural development of these studies will be the use in the future of principles of genetic engineering of new proteins to produce proteins and peptides with improved or new properties important to the economy. Figures 2; references 32: 6 Russian, 26 Western.
[616-6508]

DNA AND COMPUTERS

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 64-70

ALEKSANDROV, A. A., candidate of physical-mathematical sciences, Institute
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[Abstract] The study of nucleotide sequences by simple methods (analysis of open translation frames and the search for canonical sites) can extract only a small fraction of the information coded in the sequences concerning their functional properties. This article discusses existing and promising future methods for computerized analysis of nucleotide sequences including the construction of nucleotide sequence data bases and the application of nucleotide sequence analysis programs such as common and sitor programs developed in the United States. These programs illustrate that the basis has been laid down for the development of a new segment of molecular biology - analysis of the primary structures of nucleic acids by computer. This trend is closely related to practice and its results are used even today in the interpretation of sequences of nucleotides and in their future utilization. Doubtless in the next few years methods of the analysis of the primary structures of nucleic acids will become much more informative. In the near future, computers will be used to model the interaction of various molecular-genetic processes and the functioning of entire genomes. Figures 4; references 52: 2 Russian, 50 Western.
[616-6508]

UDC: 547.963.32

INTERFERONS AND GENETIC ENGINEERING

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 85-89

SVERDLOV, Ye. D., doctor of chemical sciences, Institute of Bioorganic
Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences

[Abstract] Gene engineering has recently succeeded in producing micro-organisms which synthesize human interferon with high effectiveness. Cloning human interferon genes is an extremely difficult task, since the rRNA coding interferon represents only about 0.1% of the total rRNA coding various proteins. Still, the genes for leucocytic, fibroblastic and immune interferons have been cloned in E. coli. Cloning the interferon genes has allowed a revolution in the study of the structure and action of interferon. Future studies intended to improve our understanding of the mechanism of biological activity of interferon will also help us to understand the mechanisms of regulation of genetic activity in higher eucaryotes. Figures 3; references 20: 2 Russian, 18 Western.
[616-6508]

GENE ENGINEERING APPROACHES TO CREATION OF ANTIVIRAL VACCINES

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 90-95

TIKHONENKO, T. I., professor, doctor of biological sciences, Institute
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[Abstract] The expanding use of vaccines in medicine and veterinary science makes the production of vaccines a promising sphere for application of gene engineering. Protective virus antibodies usually develop against the virus particle protein which forms the shell of the virus. In a typical case the shell of the viral particle is made of many hundreds or even thousands of monomer structural subunits or polypeptide chains forming a complex, three-dimensional structure. Development of synthetic antigen determinants by genetic engineering can result in the production of viruses by methods not requiring either live or killed viruses as antigens. The prospects for development of third generation subunit vaccines are analyzed. It must be emphasized that studies on the immunochemistry of viral proteins must be significantly expanded to determine the primary structure of antigen determinants of various types and encode their sequences of nucleopeptides to allow chemical synthesis of antigen determinants and polynucleotides coding these determinants in order to implement the genetic engineering approach to production of effective vaccines. Figure 1; references 40: 8 Russian, 32 Western.
[616-6508]

UDC 577.21

DNA INDUSTRY - BIOTECHNOLOGY ABROAD

Moscow ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA IM. D. I. MENDELEYEVA
in Russian Vol 29, No 2, Mar-Apr 84 pp 96-99

BAYEV, A. A., academician

[Abstract] The first commercial genetic engineering company in the world was Genentech in San Francisco, followed by Genex in Bethesda and Biogen in Europe and many other firms in the USA, England, France and other nations, all incorporated to take advantage of advances in genetic engineering to make profits. The campaign against genetic engineering on the basis of its presumed dangers has slowed commercial development in the field but has not reduced the pace of scientific advances. Development of the field has been most rapid in the USA. Development of commercial genetic-engineering products is a lengthy process, taking 6 to 8 years and requiring the investment of many millions of dollars. Over a billion dollars has been invested in

genetic engineering companies in the USA. There are more than 200 such firms, 50 of which have been organized since 1980. Practical data are presented on certain bioengineering companies typical for the DNA industry in the US, Japan, West Germany, Great Britain, France and Italy.
[616-6508]

LASER EFFECTS

UDC 617-001.4-003.9-02:615.849.19+615.849.19.015.4

METABOLIC EFFECTS OF INFRARED LASER IRRADIATION OF REGENERATIVE POST-TRAUMATIC WOUNDS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 9, Sep 83 (manuscript received 26 Oct 82) pp 49-51

CHESNOKOVA, N. P., PRONCHENKOVA, F. G., KOSHELEV, V. N. and GRUDTSYNA, M. P., Central Scientific Research Laboratory, Saratov Medical Institute

[Abstract] Male rats were employed in a study on the effects of infrared laser irradiation of full-depth skin wounds, by analysis of the wound tissue lactate (L) and pyruvate (P) levels, the L/P ratio, and the redox potential. Follow-up for 15 days of control wounds and irradiated wounds (10.6 μm wavelength, 4 mW/cm^2 power flux density, 30 sec exposure) showed that on day 4, after three irradiations, the irradiated lesions evidenced marked enhancement of glycolytic activity with concomitant activation of redox processes. This was evident in the marked increase in the concentration of L and P, reduction in the L/P ratio, and an increase in the value of the redox potential. The differences were less marked on days 8 and 15, indicating that the early regenerative tissue was most susceptible to the metabolic effects of infrared laser, consisting of increasing the flow of glycolytic end products into the TCA cycle. References 7: 6 Russian, 1 Western. [615-12172]

MARINE MAMMALS

DEAFENING VOICES OF WHALES

Leningrad LENINGRADSKAYA in Russian 8 Apr 84 p 4

[Article by A. Polyukhov]

[Text] Dolphins and other cetaceans possess a wonderfully developed sound-emitting and acoustic apparatus. In orientation underwater and when hunting, they have managed also to use echo-location much earlier and more effectively than human beings. It is known that they discover schools of fish in the ocean with acoustic signals. It is possible that this really perfected structure serves them not only as a locator, but also as a secret weapon, with which these animals are capable of paralyzing or even killing their prey.

In any case, this is what the Danish zoophysiologicalist, Bertel' Moel', from the University of Orkhus, and several of his colleagues believe. In his opinion, lancet whales (there are approximately 70 species) can amplify the sounds they create many times, transforming them into short roaring impulses of high energy. The force of the impulse changes in relation to the distance and size of the victim, and this hypothesis has been confirmed by experiments.

The Danish scientist demonstrates the logic of the theory and its validity with the example of the sperm whale. As he puts it, the gigantic whale (length of up to 20 meters and weight up to 40 tons) simply is not in condition to catch the necessary amount of small fish which makes up the basis of his food necessary for his subsistence. His maneuverability is completely inadequate, and from the point of view of energy balance, such a hunt would be a clearly wasteful enterprise.

It is another matter, if the sperm whale starts up his secret weapon and then "grazes", swallowing the paralyzed prey without effort. This is the only possible explanation of why in these cetaceans' stomachs up to 50 different sorts of fish and 30 species of warm-blooded animals are discovered at one time, even the most delicate of which often are completely unharmed by the giant's teeth. A third of the sperm whale's body consists of its head, with its colossal "forehead". Anatomical studies indicate that it is precisely here where the powerful sound generator, which emits a

force of up to 265 decibels, is hidden. The impulses are guaranteed to affect all that is living, no matter what the species or size. The huge mouth of the sperm whale, which is not useful for catching small prey, suits his leisurely swallowing very well.

The sound weapon of dolphins operates almost the same way, although it is less imposing. Not possessing such a powerful generator, they paralyze prey only at a short distance, emitting a tight cluster of signals. An abundant species of dolphins--the porpoise--in conditions of an oceanarium, now and then emit with 5 times more force than is normal for their level. This is sufficient to disorient small fish, which accomodates clever dolphins completely when hunting in the limited space of a pool. In the open sea, however, they subject small schools of anchovies to a stronger acoustic "narcosis".

Occasionally, surprised fishermen, who find themselves witnesses to such a process, simply scoop the numb fish from the surface of the sea, thanking their unexpected helpers. Characteristically, dolphins are clearly aware of the possibilities of their weapon and use it most carefully and purposefully. They never strike each other, although most often they hunt in a school. Bertel' Moel' compares them to a detachment of soldiers, each of whom is armed with a sound rifle and instructed by the collective activity.

This new theory of the Danish zoophysiolgologist alos explains a series of incomprehensible moments in the evolutionary development of cetaceans. Thus, it points out the real reason that in many species of cetaceans, their powerful teeth have never degenerated into rudiments, while their strong jaws have degenerated into resembling beaks. The acoustic generator simply supersedes the previous primitive weapons of cetaceans.

12473

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MODELING OF LETHAL ELECTRIC SHOCK

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian No 2, Mar-Apr 84 pp 52-53

[Article by V. A. Vostrikov, V. Ya. Tabak, and M. S. Bogushevich, USSR Academy of Medical Sciences Laboratory of General Resuscitology (Director--Academician of USSR Academy of Medical Sciences V. A. Negovskiy), Moscow]

[Text] In connection with the broad use of electrical energy in the national economy and everyday life, the problem of electric shock has become quite important. According to data in the literature, nine to thirty percent of all persons who come into contact with live wires are electrocuted annually (K. A. Azhibayev). Ventricular fibrillation (sudden death) has been established as the most frequent cause of those fatalities; this is a characteristic arrhythmia when a low voltage (127-380 V) A.C. current (50-400 Hz) passes through the cardiac region, that results from functional disturbances in excitation and conduction processes in cardiac muscle (V. A. Negovskiy and N. L. Gurevich). The introduction of electropulse therapy (cardiac defibrillation) into clinical and experimental practice has made it possible to control this very dangerous rhythmic disturbance (V. A. Negovskiy and N. L. Gurevich).

However, the problem of lethal electric shock cannot be limited to the phenomenon of ventricular fibrillation only. There are presently data on frequent fatalities following high-voltage (1000 V) contact both with and without ventricular fibrillation. Clinical morphological investigations in these cases often indicate substantial injuries both to cardiac muscle as well as to other vitally important organs and systems (Yu. M. Ponomareva and I. G. Ivanova; Wilkinson and Wood). However, those data for the most part pertain to individual clinical observations in which it is impossible or very difficult to establish the parameters of the injurious electrical current and their relationship to the degree of severity and outcome of electric shock.

In consideration of what has been said above we set out to work on an experimental model of lethal electric shock induced by a high voltage current.

Materials and methods

The investigation was carried out on 39 anesthetized (Promedol 8 mg/kg and a total dosage of 22 mg/kg of Nembutal to maintain a stable level of anesthesia) dogs of both sexes, weighing (P) 4-25 kg. The animals of the first group (n=28) received an A.C. current through the cardiac region along the right oblique lemniscus (the right anterior and left posterior extremities). The magnitude of the current (I) in the circuit was 0.5--4.25 A, voltage (U) was 220-2000, duration of the shock (t) was 10 seconds, and frequency (f) was 50 Hz. When fibrillation appeared, it was eliminated by a single discharge from the D 1-0.3 defibrillator (2-4 Kv). In order to avoid damaging effects on the heart during electric shock, defibrillator discharge, and fibrillation episodes, electric shock was administered to the second group of dogs (n=11) along the lower lemniscus (right and left posterior limbs, I = 2.5-3.9 A, U = 500-1400 volts, t = 10 seconds). The subelectrode areas in all the animals were thoroughly shaved (diameter of the fibrillation electrodes was 9 cm, and that of the shock electrodes was 3 x 5 cm). Multiple-ply gauze patches soaked in hypertonic sodium chloride solution were placed on the shaven skin areas. EKG's, a polycardiograph, and arterial pressure (AP) in the femoral artery and aorta, and central venous pressure (CVP) were recorded before and after electric shock. The tetrapolar thoracic retrograde method (impedance plethysmograph RPG 2-02) was used to evaluate central hemodynamic indices. The method for applying the electrodes is described by Namon and Gollan. The 6NEK-4 electrocardiograph (GDR) and the SAN-El polygraph (Japan) were used as the recording instruments. The results were processed statistically by the use of the Student, Wilkinson-Mann-Whitney criteria and correlation analysis.

Experimental results and discussion

Various empirical formulas establishing the relationship between a low-voltage A.C. that induces ventricular fibrillation and animal weight have been suggested for evaluating the threshold values of that current. For example, $I = 30 + 3.7 P$, $t = 3$ s., $f = 50$ Hz, etc. (A. P. Kisilev). Analogously, it has been suggested that the magnitude of a high-voltage current that induces lethal shock, both after fibrillation removal as well as in cases where there is no fibrillation, is also related to the animal's weight. Therefore, the current magnitude that induced lethal shock in most (87.5%) of the dogs in the first group was determined. A mathematical processing of the results indicated that life time (in hours) is related to the coefficient K ($r = -0.46$; $P < 0.01$):

$$K = -\frac{I}{\sqrt{P}}$$

The animals with $K \geq 1.2$ perished in 100% of the cases during the first 24-hour periods (2.5-17.5 hours). This coefficient was 1.04-1.19 in the surviving dogs (12.5%). One should note that there was no ventricular fibrillation in four dogs ($I = 30 - 4.25$ A, $K = 1.13 - 1.36$). The animals in the second group perished within 10-38 hours without fibrillation. Life duration reliably correlated with the K coefficient ($r = -0.78$, $P < 0.01$).

As can be seen from the table, following the administration of a high-voltage electric shock, the dogs in the second group lived an average of 5.8 hours (35.6%) longer than the perished dogs of the first group, although the difference was not reliable. This can apparently be explained by the variable path taken by the A.C. current through the body as well as by individual animal sensitivity to electric shock.

As early as the first hour of observation, the majority of the dogs in the first and second group exhibited marked changes in central hemodynamic indices and in the phase structure of left ventricle systole (with respect to the initial state): There was a reliable reduction in minute (by 53.6% and 29% respectively) and in the stroke (by 60% and 41.4%) volume of blood circulation. Central venous pressure--from 5.6 ± 4.3 and from -2.1 ± 2.4 to -8.6 ± 4.3 and -11.0 ± 3.6 mm H₂O respectively; an increase in total peripheral resistance (by 143% and 43%); an increase in the stress/expulsion period ratio (by 71% and 50.3%; $P < 0.05$) that reflects a disturbance in contractile function of the myocardium (Boudoulas, H. et al.) and of central hemodynamics. The average arterial pressure (AAP) following a brief period of acute hypertension (1-2 minutes after electro-shock application) remained essentially the same up to the 4th to 5th hour of observation (101.6 ± 3.4 mm Hg). Subsequently, as the stroke and minute cardiac volumes were further reduced, the central venous pressure and the level of the average arterial pressure reliably decreased (to 45 ± 6.6 mm Hg) towards the last hour of life (in dogs of the first and second groups).

Table 1. Life Duration of Dogs Subjected to High-Voltage Electric Shock in Relation to Electric Current-Mass Characteristics

Group of animals	$K = \frac{I}{m}$	Life duration of dogs, r	r	P
1st (n = 18)	1.20 ± 0.04	16.3 ± 2.0	-0.46	<0.01
2nd (n = 10)	1.18 ± 0.05	22.1 ± 2.8	-.78	<0.01
1st and 2nd (n = 28)	1.19 ± 0.03	18.4 ± 1.67	-.60	<0.01

Note: Surviving dogs and animals for which no time of death was recorded are excluded from the 1st and 2nd groups. Differences between the K coefficients for the 1st and 2nd group animals are not reliable

Conclusions

1. The data on hemodynamics and the phase structure of left ventricular systole indicate severe disturbances of cardiovascular function which in all probability lead to the formation of a terminal state and subsequent irreversibility.
2. A relationship was established between the dog's life duration, their body weight and the magnitude of the shock current.

3. The formation of irreversibility during high-voltage electric shock is independent of the pathway taken by the electric shock and the probable development of cardiac ventricular fibrillation.

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6289

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USE OF FIBER OPTICS FOR TRACHEAL INTUBATION

Moscow ANESTEZIOLOGIYA I REANIMATOLOGIYA in Russian No 2 Mar-Apr 84 pp 54-56

[Article by V. N. Aleksandrov and B. N. Maksimov, Department of Anesthesiology and Resuscitology with [GBO -? course] (Chairman-Professor V. N. Aleksandrov), Moscow Medical Stomatological Institute imeni N. A. Semashko, Municipal Clinical Hospital No 36 (Chief Physician E. A. Yakubov), Moscow]

[Text] The advent of light-transmitting fiber optics has significantly expanded opportunities for conducting endoscopic studies of internal human organs. There are today millions of persons who have undergone endoscopic examinations with the aid of fiber-based instruments for transmitting images.

Probably the first report on the use of a fibroscope in anesthesiology is the publication by Murphy, who used a fibrous choledocoscope for a tracheal intubation in the presence of anatomic developmental anomalies of the facial skeleton. The production of the fiber bronchoscope (FBS) and its clinical application have served as the basis for suggesting its possible use as a guide for an endotracheal tube (Coniers and coauthors; Taylor and Towey; Tabir and others). The invention of the fiber laryngoscope in the FRG and USA has resolved many difficult aspects of endotracheal anesthesia (Kronschwitz; Stiles et al.; Davis; Medot et al.).

Fiber optics in anesthesiology is being used for various purposes. Moyers and Gregory point out the possible use of FBS for diagnosing disturbances in gas exchange. Okho et al., Lindholm note the safety and accessibility of washing the tracheo-bronchial tree with the FBS. V. N. Aleksandrov and coauthors, Hewer and Atkinson, who used the fibroscope as a guide in tracheal intubation, noted the positive attributes of the procedure and possible complications.

However, most of the indicated reports are based on a small sample of clinical material which encompasses only a certain narrow segment of clinical practice. This circumstance is the basis for summarizing the experience gained in working with fiber optics in anesthesiology. We have now had five years of experience in using the FBS BFB-2 (made by the Olympus firm, Japan) in a multi-specialized hospital with more than 300 patients.

The most frequent need for using the FBS involved impossible tracheal intubation.

Observation 1.

Patient A. (female) 46 years old. Admitted for surgery in regard to a uteral fibromioma. Examination revealed excessive food intake (weight: 96 kg, height: 165 cm), short, thick neck. Following premedication, 900 mg of Hexenal and 600 mg of Listenon were administered intravenously. However, the anesthesiologist was not able to perform the intubation in the classical or improved Jackson position, the lateral Sanchez-Salazar and Burstein position, or by means of the Kuhn tactile intubation method, or even blind through the nose. The operation was postponed since the intubation attempts ended with the extraction of the upper jaw incisors. A supplementary examination was made. A spinal column X-ray showed restricted mobility of the cervical section of the spine (ankylosing spondylitis of the 1st and 2nd cervical vertebrae) and a small "solution" of the lower jaw's dental arch which made intubation impossible. Seven days later the operation was performed and intubation was completed with the aid of FBS through the nose without any complications.

A similar intubation complication as well as a review of 37 other difficult intranasal tracheal intubations, along with the underlying illness and concomitant pathology allows us to conclude that fibrolaryngoscopy and tracheal intubation are indicated for obese patients, restricted mobility of the cervical spine, andyloses of the temporal-mandibular joints, restricted mouth openings, etc. Tracheal intubations performed on 26 patients with the help of FBS in the presence of various concomitant facial and cervical pathology turned out to be a most suitable and non-traumatic procedure. Fibrolaryngoscopy in these situations completely resolved the problem of difficult intubations. The following observation serves to confirm these conclusions:

Observation 2.

Patient K. (male) 56 years old. Occupation, engineer. Suffered a carniocerebral injury (brain contusion, drainage of 120 ml of subdural hemotoma resulting from a depressed fracture of the temporal-parietal bone). Three months later it became necessary to perform osteoplastic surgery to correct a defect in the skull. During the recovery period a persistent fibrous ankylosis of the mandibular lower jaw joints was observed. Also noted were restricted mobility in the cervical spine and a 14-centimeter reduction in the breast-chin distance (the normal distance is 16.5 cm). These circumstances were grounds for intranasal intubation with the aid of a FBS which was performed without any complications. The patient recovered.

Tracheal intubation is considered an important factor in traumatic injuries of the cervical spine (C₃ - C₆) and intetraplegia where any movement of the head can have tragic results. In these situations, fiber intubation is an alternative to preventive tracheotomy. We performed three fibrointubations in patients with fresh cervical spine injuries. We can say that the method is safe and non-traumatic. One might mention here a special case of intubation

under "acrobatic" conditions in a patient with a traumatic injury to the thoracic vertebrae Th^{VIII}-Th^{XII} with the patient on his abdomen. In this instance, fibrointubation was the ideal intranasal method in an atypical position on the operating table.

Intubation in maxillofacial surgery is an important problem in anesthesiology. The success of an operation, and a post-operative period without complications, frequently depend on the know-how and skills of the anesthesiologist to perform intranasal blind intubation, to use the Kuhn tactile intubation method, or employ a catheter-guide with the aid of cervical lateral fluoroscopy, the Waters retrograde intubation method through a tracheal puncture, or by the spiraling technique (A. D. Al'tov; Munson and Cullens; Singh). In view of the fact that each of the indicated methods has contraindications and requires certain essential conditions for success, these methods are often not feasible or at least hazardous in combined pathology because of possible asphyxiation, trauma, or hemorrhage. Preventive tracheotomy is the safe procedure in these cases.

However, our experience in the performance of 241 tracheal intubations in patients with microgenia, prognathism, ankylosis of the temporal-lower mandibular joints, facial skeleton trauma, upper and lower jaw injuries, tongue tumors, and patients who have had frequent plastic surgery on soft facial and cervical tissue or osteoplastic surgery of the upper and lower jaws, allows us to conclude that nasotracheal intubation with the aid of a FBS that is used as a guide for the endotracheal tube does not present any difficulties if applied with the necessary skills. In fact, visual control of the larynx, glottis, the possible alignment of dislocated stomatopharyngeal and laryngopharyngeal interrelations, as well as the safety and relative non-traumatic nature of laryngoscopy, has significantly facilitated tracheal intubation in stomatological practice.

The safety of fibrointubation is also assured by the tested method of anesthesiological control (V. N. Aleksandrov and coauthors). The combination of Lidocaine, Trimercaïne or Percaine for local nasal passage anesthesia, and premedication with a neuroleptic (Droperidol) and initial narcosis with Hexanol with subapnoic doses of Tubocurarine (5 mg) guarantee the safety of fibrolaryngoscopy and tracheal intubation.

At the same time, intranasal intubation in general, and fibrointubation in particular, are contraindicated in nasal passages, upper jaw injuries, nasal septum deviation, and other anomalies. Such cases call for fibrolaryngoscopy carried out through the dental plate defect. We used this method of intubation in six patients. In patients with complex trauma injuries of the upper jaw, ankylosis of the temporal-mandibular joints, microstomia or cicatricial contractures of the neck and face, fibroscopy obviated the need for preventive tracheotomy or retrograde intubation. This consequently made the post-operative period easier and became a viable alternative to tracheotomy.

Observation 3.

Patient B (male), 29 years. First category invalid. Railroad electrician. Received an electric shock at work, from a six-watt electric arc. Widespread

defect of the right half of his face, absence of upper jaw, zygomatic bone, eye socket, and right half of the nose. Cataract of the left eye, cicatricial contracture of the neck and fibrous ankylosis of the temporal-mandibular joints, orostomia (oral degree of opening up to 1.5 cm), leftward deviated nasal passages and nasal septum, and narrow nasal passages. Fibrolaryngoscopy through the dental plate defect was the intubation method chosen which made it possible to perform a seven-hour operation in which rib tissue and a skin-muscle graft were transplanted to the face.

The operative and post-operative-periods for most patients proceeded smoothly without any complications associated with the fibrointubation method. Eleven complications from intranasal fibrointubations were recorded. There was moderate bleeding from the nasal passages in six patients immediately after the tube was inserted into the trachea. In our opinion, this was associated with an injury to the venous plexus of the nasal mucosa. Despite the apparent width of the nasal passages in four other patients, the endotracheal tube did not go through the nasal passages and resulted in the tube's "strangulation" together with the fibroscope. This made it necessary to resort to orotracheal intubation through the dental plate defect. That procedure was made obligatory in these situations where there was partial adentia (premolar or molar). Intranasal intubation with the aid of FBS was not successful in one patient who underwent two previous tracheotomies because of a discrepancy between the opening of the constricted trachea and the diameter of the endotracheal tube. This complication called for a repeated (a third!) tracheotomy during the successive plastic surgery performed on the face.

Our experience in the use of FBS for tracheal intubation, therefore, allows us to conclude that this method is safe, relatively simple, and available for broad anesthesiological practice. Its application significantly expands the potential of endotracheal anesthesia and enhances its safe use, given the anatomical characteristics of the facial skeleton and neck.

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UTILIZATION OF DIFFERENT SULFUR SOURCES BY PROPIONIC BACTERIA

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 6, Nov-Dec 83
(manuscript received 11 Jan 83) pp 875-879

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imeni M. V. Lomonosov

[Abstract] Most prokaryotes and plants are capable of assimilating sulfate as the source of sulfur reducing it to thiol groups included in sulfur-containing amino acids. Utilization of sulfur compounds with different degree of oxidation by propionic acid bacteria: *Propionibacterium shermanii*, *P. freudenreichii*, *P. petersonii* and *Escherichia coli* was studied. All of these bacteria grew adequately on a synthetic medium containing sulfate salts as the source of sulfur. It was established that a 2.5 mM concentration of sulfite provided adequate medium for normal growth of bacteria; with higher concentration *P. shermanii* growth was inhibited. *P. shermanii* grew well on thiosulfate and even on elemental sulfur forming a sulfide. In utilizing a sulfate source, *P. shermanii* exhibited an oscillatory behavior in which utilization of sulfate alternated with its release into the medium. Figures 7; references 18: 2 Russian, 16 Western.
[613-7813]

UDC 57.[045 + 0.86.13]:579.8.06

RESISTANCE OF MICROORGANISMS FROM MESOSPHERE TO PERIODIC FREEZING-THAWING

Moscow MIKROBIOLOGIYA in Russian Vol 52, No 6, Nov-Dec 83
(manuscript received 1 Jul 82) pp 902-908

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[Abstract] Earth atmosphere represents a gaseous membrane which can be subdivided by its composition, temperature and electric characteristics into four subdivisions: troposphere, stratosphere, mesosphere and

thermosphere. In spite of unfavorable conditions, microflora exists in earth atmosphere, both in the positive and negative temperature zones. Since these microorganisms originate in the earth crust, it was of interest to study the effect of freezing and thawing on these microorganisms. The experiments were done on conidia of the *Aspergillus niger* and *Penicillium chrysogenum* fungi isolated from the mesosphere and compared to the same type of conidia from a standard collection of microorganisms. Analysis of electron-microscopic data showed that after ten freeze-thaw cycles the outer "backbone" layer of these spacial "envelopes" broke down and the plasmalemma membrane became stratified. Already after one cycle, 40-50% of the conidia died, reaching the death level of 80% after 5-10 cycles. Thus, the results showed that along with sun radiation, exposure to periodic freeze-thaw cycles lowers the number of microorganisms in earth atmosphere. Figures 3; references 20: 13 Russian, 7 Western.
[613-7813]

UDC 582.282.23:577.152.1-582.6

MONOCHLOROPHENOLS AS ENZYME SUBSTRATES OF PREPARATORY PHENOL METABOLISM
IN *CANDIDA TROPICALIS* YEASTS

Moscow MIKROBIOLOGIYA in Russian Vol 56, No 6, Nov-Dec 83
(manuscript received 3 Sep 82) pp 956-961

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[Abstract] The goal of this study was to evaluate the possibility of obtaining *Candida tropicalis* strain yeasts capable of utilizing monochlorophenols, as one way of protecting the environment from stable toxic products. Phenol monooxygenase and pyrocatechase, enzymes of preparatory metabolism of phenol, were shown to be capable of transforming 3- and 4-chlorophenols to 4-chloropyrocatechols and then to β -chloromuconic acid. The *C. tropicalis* obtained in this work has shown to possess almost no transformational activity on 2-chlorophenol; 3- and 4-chlorophenols were also shown not to be nutrient sources for *C. tropicalis*. Part of the problem could be that chlorophenols are toxic substances and therefore they had to be utilized at very low concentrations, so that accumulation and isolation of possible mutants was extremely difficult. Figure 1; references 14: 2 Russian, 12 Western.
[613-7813]

MOLECULAR BIOLOGY

TGU'S INSTITUTE OF GENERAL AND MOLECULAR PATHOLOGY

Tallinn NOORTE HAAL in Estonian 16 Mar 84 p 1

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[Abstract] This article deals, briefly, with the origins of the TGU Institute of General and Molecular Pathology and, more extensively, with its interests and activities. The Institute, now five years old, is an outgrowth of the central laboratory for medical research created at the university in 1962. The Institute is primarily interested in heart and blood-vessel pathology, research on the digestive tract, immunology, intracellular structures and mechanisms, the transfer of genetic information and monoclonal antibodies. Recently considerable work has been done in the fields of myoglobin antibodies and coronary surgery. The article stresses the impossibility of placing a monetary value on medical discoveries and also underscores the importance of unselfish teamwork and cooperation with scientists throughout the Soviet Union and abroad, including the United States.

12327

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NONIONIZING ELECTROMAGNETIC RADIATION EFFECTS

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COMBINED EFFECTS OF MAGNETIC FIELD AND ANTIHYPOXANTS ON HIPPOCAMPAL
EPILEPTOGENIC FOCI IN RABBITS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 9,
Sep 83 (manuscript received 24 Nov 82) pp 29-31

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[Abstract] A study was made of the effects of different physical and chemical factors on hippocampal epileptogenic foci induced by penicillin injection in the rabbit. Exposure of the animals to a 60 mTesla magnetic field (MF; hypoxant), gutimin (50 mg/kg, s.c.; antihypoxant), or hydroxybutyrate (25 mg/kg, i.m.; antihypoxant), or MF/gutimin or MF/hydroxybutyrate combinations prior to injection of the penicillin and evaluation of the EEG correlates, revealed that MF and gutimin potentiated epileptogenic activity. Hydroxybutyrate was essentially without effect. The MF/gutimin combination reduced somewhat the epileptogenic activity to below the level observed when either factor was used alone, while the MF/hydroxybutyrate combination decreased the epileptogenic activity seen in control animals injected with penicillin alone. The effectiveness of hydroxybutyrate, in distinction to the results obtained with gutimin in alleviating epileptogenic activity, was ascribed to its antihypoxic effects via stimulation of tissue respiration and oxidative phosphorylation, and to its 'narcotic' properties manifested by depression of electrical activity and, therefore, of epileptogenesis. Figures 2; references 9 (Russian).

[615-12172]

UDC 612.83:81.014.46:[547.95:547.943

EFFECTS OF ENKEPHALIN-LIKE TETRAPEPTIDE ON INSTRUMENT-MEDIATED FOOD SEEKING
BEHAVIOR IN RAT

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 9,
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[Abstract] The effects of an enkephalin-like tetrapeptide, Tyr-O-Ala-Gly-Phe-NH₂ (TAGP), on conditioned, instrument-mediated food behavior in out-bred rats were studied to determine the effects of such agents on goal-directed behavior. Administration of TAGP (50 µg/kg s.c. or i.p.; 0.9 µg intraventricularly) interfered with the specific goal-oriented behavior for up to 5 months, resulting in a decrease in food intake by 40.3%. In addition, injection into the cerebral ventricles increased the number of misdirected responses. Nonspecific changes consisted of altered patterns of motor activity, stretching, waddling, tail arching, change in abdominal muscle tone, etc. Administration of naloxone hydrochloride (2 mg/kg, i.p., Narcan, Dupont), an opiate antagonist, four days after intraperitoneal TAGP had no effect on the consequences of TAGP administration. Taken in toto, these observations indicate that TAGP does not act on the µ-receptors in the brain, but affects the central-peripheral organization of behavioral acts. The altered behavioral states resulting from TAGP administration may be regarded as representing a biological model of psychopathologic conditions. Figures 3; references 15: 2 Russian, 13 Western.
[615-12172]

ROLE OF ARACHIDONIC ACID IN *S. TYPHIMURIUM* ENDOTOXIN-INDUCED THROMBOCYTE AGGREGATION

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[Abstract] In vitro studies were conducted on a number of factors affecting donor blood thrombocyte aggregation to delineate the specific role of arachidonic acid in such phenomena. *S. typhimurium* endotoxin (STE), arachidonic acid (AA) and ADP ranked as follows in their ability to induce thrombocyte aggregation: STE < AA < ADP. Addition of ADP to the test system with STE and to the system with AA markedly enhanced aggregation. Significant enhancement over control values was also obtained with AA and STE combination, and subsequent addition of ADP to this system further increased the degree of aggregation. These observations indicate that AA is involved in thrombocyte aggregation and increases the extent of aggregation induced by STE. The presumed mechanism involves transformation of AA into prostaglandins by the activated thrombocyte lipoxygenase and cyclooxygenase. Figures 2; references 10: 7 Russian, 3 Western. [615-12172]

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EFFECTS OF NEUROTROPIC AGENTS ON SYNAPTOSOMAL RESTING POTENTIAL

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NIKUSHKIN, Ye. V., KRYZHANOVSKIY, G. N., GLEBOV, R. N., MALOLETNEVA, O. Yu., KAPLUN, A. P., MAYSOV, N. I., GANKINA, Ye. M. and SYUTKIN, Ye. A., Laboratory of General Pathology of the Nervous System, Institute of General Pathology and Pathologic Physiology, USSR Academy of Medical Sciences; Institute of Fine Chemical Technology imeni M. V. Lomonosov; Institute of Pharmacology, USSR Academy of Medical Sciences; Central Scientific Research Laboratory of the Fourth Main Administration, USSR Ministry of Health, Moscow

[Abstract] A fluorescent label (3,3-dipropylthiodicarbocyanine) was used in the determination of the resting potential of cerebral synaptosomal membranes isolated from the rat brain, and in the evaluation of the effects on the resting potential of cyostatic (cytochalasin B, colchicine) and

neuroleptic (leu-enkephalin, met-enkephalin, tuftsin, chlorpromazine, trifluoroperazine, haloperidol, imipramine, diazepam, fenazepam) agents. Under the conditions employed, the synaptosome retained a resting potential in the 70-80 mV range. In concentrations of 10^{-4} to 10^{-3} M cytochalasin B, colchicine and leu- and met-enkephalin had no effect on the resting potential. However, cytochalasin B in concentrations of 4×10^{-4} M, and greater, caused aggregation of the membranes. The synaptosomal membranes were depolarized by diazepam and fenazepam in concentrations of 10^{-3} M, and by chlorpromazine, trifluoroperazine, haloperidol and imipramine in concentrations of 10^{-4} M. Figures 2; references 13: 5 Russian, 8 Western.
[615-12172]

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CHRONIC STRESS-INDUCED CHANGES IN BRAIN HIGH-ENERGY COMPOUND LEVELS AND THERAPEUTIC EFFECTS OF PSYCHOTROPIC AGENTS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 9, Sep 83 (manuscript received 25 May 83) pp 72-74

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[Abstract] Neurochemical studies were conducted on different regions of the Wistar rat brain to correlate the effects of long-term stress (anxiety) on concentration of high-energy compounds (ATP, ADP, AMP). After 12 days of stress the concentration of ATP and ADP showed two- to three-fold decrease in the cerebral cortex and the limbic system, while the decrease in the medulla oblongata was less pronounced (ca. 25%). The concentration of AMP showed a corresponding increase in the cortical and limbic tissues, and a moderate reduction in the medulla oblongata. Treatment with a variety of tranquilizing agents exerted a protective effect as evidenced by the maintenance of normal levels of ATP and ADP in the brain tissues, with GABA and nicotinic acid derivatives being the most effective preparations. The tranquilizers also served to reduce the incidence of peptic ulceration and favored normalization of adrenal morphology. References 12: 8 Russian, 4 Western.
[615-12172]

PUBLIC HEALTH

BETTER COORDINATION BETWEEN PHARMACEUTICAL RESEARCH AND PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 May 84 p 2

[Article by A. Sorokin, First Deputy Minister of Medical Industry:
"Scientist, Medical Specialist, and Worker--in the Brigade"]

[Text] We, just as workers in other industries, have also thought about why relations between science and actual practice frequently become a tug-of-war contest. Could it be that the engineer or worker is less interested than the scientist in success of a common cause?

These questions have disturbed us greatly in recent years. Fundamentally new scientific research directions have developed in the medical industry. Such areas include genetic engineering, biotechnology, polysaccharides and enzymes. New ways have been discovered for preserving the health, and at times saving the lives, of many thousands of persons. Under such circumstances it is particularly important to accelerate the introduction of scientific achievements into industry. But how?

Essentially, the task is for industrial workers to incorporate someone else's research efforts into their own work. This is simple to formulate but rather difficult to accomplish because work on new ideas naturally breaks down into two stages: scientific research and the incorporation of its results into industry. The two stages are markedly different. Not only have we been unable to integrate those stages but until recently we haven't even been able to bring them close to each other. But not long ago we did find a solution to this complex problem, at least in our industrial sector.

At first appearance, the idea would seem to be quite simple: To tie the experienced worker into the research being done on new medicinals as soon as possible. On the one hand, the production worker now actively participates in scientific research. Together with the scientist, he is concerned about making the new preparation not only effective, but technologically suitable for easy series production. And even at the early stages of the new product's development, he determines what kind of starting materials are needed for manufacturing the product, and designs the required machinery and set-up. The scientist's idea gradually becomes his own idea. He often joins the investigators' editorial staff and is genuinely concerned about its fate. On the other hand, the efforts that were previously made step-by-step can now be accomplished in parallel. This makes it possible to cut by one half or more the time required to make new products.

An organizational form has also been found--the integrated target brigade of specialists (TsKBS). We sometimes call them scientific-production brigades. These include scientists, designers, planners, production engineers, mechanics, repairmen, machine operators, and Department of Technical Control (OTK) representatives. In other words, all those persons upon whom depend, at various stages, the scientific-technical development, testing, and finally, the series production of a new preparation.

The creation of integrated target brigades opens incomparably broad opportunities for the joint creative labor of workers, designers, engineers, and scientists. Illustrative of this development is the experience of the Leningrad Order of the Badge of Honor "October" Chemical-Pharmaceutical Production Association. Widely practiced at that Association are joint operations of various subdivisions, based on cooperative agreements and the supervision by divisions producing new types of products over basic production shops, as well as many other progressive forms of collective activity.

The members of the integrated brigades, bound by a unified plan, by jointly adopted socialist pledges, and, of no less importance, a material interest in the final result of their labor, are striving to perfect new types of production as quickly as possible, to raise their quality, and expend materials and resources economically.

Incidentally, the workers and employees of this Association, headed by Chief Engineer L. Seleznev, all took part in the development and introduction of a fundamentally new preparation for treating cardiovascular diseases--Riboksin. Working together with them in the integrated target brigade were specialists of the All-Union Scientific-Research Technological Institute for Medical Antibiotics and Enzymes, associates of the All-Union Industrial 'Soyuzantibiotik' Association, and the Penza Medicinal Preparation Plant. In a total of just three years, instead of the usual eight to ten years, the entire research cycle was completed. This was due to the efficient mutual ties between all of the brigade's links, the genuinely motivated and creative work of the many people comprising the collective of chemists, designers, production engineers, and OTK personnel among whom special mention should be made of Central Plant Laboratory Chief of the "Oktyabr'" Association A. Brill', one of the best brigade leaders of this enterprise, V. Tikhomirov, as well as Deputy Shop Chief of the Penza Medicinal Preparation Plant L. Sokolov. Within a short period of time, the industrial regulations for production were worked out and the first batch of this exceptionally essential drug was released.

The development and production of Spirobramin was accomplished substantially earlier than was scheduled. Medical specialists have long awaited this anti-tumor preparation.

The preparation and introduction of this preparation was the work of an integrated brigade of specialists which included associates from the All-Union Scientific-Research Chemico-Pharmaceutical Institute imeni Sergo Ordzhonikidze, employees of the Leningrad 'Framakon' Chemico-Pharmaceutical

Production Association, and the Moscow 'Moskhimfarmpreparaty' Chemico-Pharmaceutical Production Association imeni N. A. Semashko.

In order to accelerate the drug's release, the All-Union Scientific-Research Chemico-Pharmaceutical Institute's production-experimental plant and Laboratory for the Synthesis of Anti-Cancer Drugs assisted the 'Farmakon' association in large measures in the preparation of the semi-finished product for the final synthesis of the Spirobramin powder. Without waiting for the industrial production of this powder to be completely set up, associates of the 'Farmakon' Association's manufacturing laboratory for finished medicinals, in their turn, began parallel work at the aseptic section of the ampule shop of the 'Moskhimfarmpreparaty' pilot plant.

The work of specialists in the integrated target brigade on the production of extended-action nitroglycerine and several other new preparations is another example of such interaction and effective cooperation between persons in associated enterprises.

There are currently about thirty target programs in our industrial sector on which integrated specialist brigades are working. Practice has demonstrated the vitality and effectiveness of this new form of collective organization and labor incentive. The production program of 220 various medicinal products was completed during the last Five-Year Plan. The production of 150 new preparation is slated for the current Five-Year Plan. Of course not all the problems of such provisional collectives have been resolved. The distribution of funds among persons carrying out this work who are under the jurisdiction of different administrative organs is complicated. The system required for encouraging all members of the collective to achieve the final results of projects has not been completely clarified.

In consideration of the importance of this problem, the Department of Economics, Organization, and Production Planning at the Leningrad Chemico-Pharmaceutical Institute has been commissioned to undertake a series of studies on making industry-wide procedural recommendations. Work is also proceeding on several other problems.

However, in order to complete the "research-production" cycle in the shortest possible time, the efforts alone of scientists, specialists, and workers in the medical industry, even under conditions of efficient organization and cooperative labor, are still not enough. We frequently find that we are ready to release a certain drug, but are not able to do so. We are let down by either the equipment suppliers, builders, or chemists.

That was the case, for example, with Paratsetam, a very effective preparation for treating vascular diseases of the brain. Its production was mastered by the "Olaynfarm" Association as early as 1980. We are now manufacturing injectable solutions in accordance with USSR Ministry of Health requisitions. But we are unable to release the tablet or capsule form of the drug in the required volume. The chemists are still not providing us with enough of the base material--alpha-pyrrolidone.

But surely it is possible to avoid such discrepancies. We just need closer contact between the personnel in the associated enterprises, and a common interest in the matter at hand. To that end, we are now restructuring our work.

Quite recently, for example, a unified program for the development, clinical testing, and industrial introduction of a number of new anti-tumor agents was jointly approved by the USSR Ministry of Health and the USSR Ministry of Non-Ferrous Metallurgy. That program's implementation will be based on the principle of creating integrated target brigades of specialists.

It is just such an inter-industrial route that must, on a priority basis, accelerate scientific-technical progress in the medical industry and help in providing physicians with new medicinal preparations.

6289

CSO: 1840/589

NEED FOR MORE CONVENIENT SCHEDULING OF MEDICAL APPOINTMENTS

Moscow TRUD in Russian 18 Jan 84 p 2

[Article by reporters I. Vinokurov, Yu. Merzlyakov, A. Shilova and Ye. Ukhov of the cities of Almet'yevsk, Brezhnev and Kazan: "Waiting in Line for the Physician" under the rubric "Unexpected Inspection by 'Trud'"]

[Text] At the Almet'yevsk Interrayon Film Library the staff is exclusively female. And, the Chief, L. Zhikhareva, had, willy-nilly, to notice that the endless requests for medical appointments for some reason always coincided with the busiest time of the work day. She decided to check whether it was really impossible to see a physician at another time.

"I came to the medical office at seven in the morning," she writes to the editorial staff. "My worker was first for Physician Averkina. We waited for one hour, then another hour in an empty waiting room--no one appeared. At nine the chief of the medical office herself started to see patients. By this time more than seventy women had gathered in the corridors. Two of them complained that they were constantly steered to appointments before eleven, and not once was the physician interested to ask whether this was a convenient time."

"They [the physicians] will not have an "8" marked on a timesheet as the hours spent on treatment and examination are not taken into account. On Averkina's doors I read the schedule: 'For pregnant women--Monday, Tuesday from 8 to 11; Wednesday--Trade union day; Thursday, Friday--from 14 to 17'. Saturday is not marked on the schedule. But, most of the visitors [patients] work the first shift."

"Now all of us are striving to improve work discipline at the work place, we are trying to plug all the leaks of working minutes--smoking breaks, tardiness, tea drinking, chatting...But, we allow this kind of wastefulness!"

It is with this letter that we started the unexpected inspection. The Chief Physician of the Almet'yevsk maternity home, Ye. Motorina, believes that the medical office, entrusted to her, operates at full capacity, both day and night, servicing women from all over the city. And, it is they themselves who do not choose to come here at the end of the working day.

We shall not deny that considerable medical service is really given. And, this is so despite the fact that there is a shortage of specialists. However, let us compare the office hours with the work schedules of enterprises. Are they convenient? A medical office operates from 8 to 19 (and not 7 to 20) hours. But, lectures are given from 9 to 11 and the hours of the chief physicians are from 9 to 11...

"The physicians themselves advise us to come in the afternoon," says T. Semenova, at a spiral seam pipe plant. "To ask for leave each time is unpleasant--already at work they look at you displeased, but what else is there to do if one can catch the physician only before lunch?"

On the 29th and 30th of November, 186 women were received during the first half of the day, and in the evening--only seven. And, allowing that not every one of them is an "involuntary absentee"--someone must be on sick or maternity leave--nevertheless, these are losses of working hours that on a city scale are counted in terms of many hundreds, or even thousands of hours.

...Even the teeth of a healthy person start to hurt from visiting the Dental Polyclinic of the Avtozavodskiy Rayon in the city of Brezhnev. The offices are located on the floors of a dormitory, the corridors are crowded and the people, who are waiting, languish on the stair landings and steps. And, what is it like for a patient with a gum boil for whom, without all this, the world is not pleasant?

"Before you get to the physician, you are pretty tired," says the Chief of the OTiZa SMU-63 [Labor and Wages Department of the Construction and Installation Department] of the house building combine, G. Doyzhenok. There are at most 80-90 tickets for the two shifts, but there are many more who wish to see the dentist. From morning, one stands in line for a long time to register and, even if one gets a ticket, one cannot choose the time."

He speaks with knowledge of the situation. The day before he came at five in the morning, but even at distant approaches to the sacred window his chances for success proved to be zero. Today, having learned by bitter experience, he arrived at four, but the ticket he received was not for the hour he requested.

An autobus driver, V. Vafin, dashed in with a face distorted by suffering. A sudden toothache forced him to leave his regular route and to drive to the Polyclinic. Running ahead of the story, let us note that after some four hours when we were going outside, his autobus was still standing near the entrance. The situation is just as tense in the children's department. In order to have a dentist look at their offspring, the parents have to stand in line for a ticket...from midnight. But, even a sleepless night watch does not guarantee success: V. Alekseyeva reached the entrance as the clock struck twelve midnight and was already the fourth [in line].

"There is a shortage of specialists," explains the Chief of Therapy Department and President of Profkom [Trade Union Committee], V. Ivanyukina. "Now, we have 12 vacancies--almost in all specialties. The loads of the therapists and prosthetists are particularly heavy."

However, references to objective reasons are hardly pertinent when the topic of discussion is improvement of service quality, convenient forms of medical service for the population, such as preregistration, an emergency office for those suffering with acute pain, a physician on duty until morning, and so forth. To accomplish this, the work has only to be organized in accordance with the needs of the population. As was done, for example, in Polyclinic No. 13 of the Production Association "Tasma" imeni V. V. Kuybyshev.

Here, by the influx of patients, Friday cannot be distinguished from Saturday--the rhythm of work during free days is the same as during work days. There are few people in the hall, the traditional lineup for registration is absent, and those wishing to get an appointment with a specialist pick out a fixed day and hour and record this in the physician's "personal" journal. The medics of "Tasma" were the first in Kazan to change over to the self-registration method, which according to the calculations of economists, has released quite a few man-hours to industry. Thus, losses of time, which earlier was spent by patients visiting medical offices, have been reduced by almost 30 percent.

Of course, any progressive form is good if it is in keeping with its content. Even in such a seemingly nonurgent mechanism as medical servicing of chemists we found deficiencies, which the Deputy Chief Doctor of the Polyclinic, R. Kirsanova, attributed to understaffing. And, this is readily seen. A long line had gathered in front of the therapist's office.

At the Ministry of Health of the Tatar ASSR we were told that in the republic today the overwhelming majority of ambulatory-polyclinic institutions, dental polyclinics and dispensaries operate under new conditions, convenient for the population, and Saturday office hours have been extended. A survey of the population conducted by questionnaire in two rayons of Kazan showed that many would like to have an earlier appointment in the morning, on their way to work. This desire was taken into consideration, and several medical offices now open their doors from six or seven in the morning.

But, as results of the inspection show, the working conditions of medics as they relate to the interests of labor collectives of plants, organizations and buildings are far from corrected everywhere. To receive quality medical care during free time, not during working hours, still remains an insoluble problem for many patients.

RESPONSE TO "TRUD" ARTICLE ON "WAITING IN LINE FOR THE PHYSICIAN"

Moscow TRUD in Russian 6 Apr 84 p 2

[Text] In the report under the above title, published 18 January 84, the topic discussed was the inconvenient scheduling for the population of some Tatar medical institutions. Responses have been received from the First Deputy of the RSFSR Ministry of Health, G. Sergeyev, and the Minister of Health of the autonomous republic, I. Mukhutdinov. Special resolutions of the Executive Committees of the Almetyev and Brezhnev City Councils have

been taken, and an order has been issued according to the Tatar ASSR Ministry of Health. Shortcomings have been eliminated. Moreover, in the city of Brezhnev twenty additional staff positions for dental physicians have been allocated, and in Polyclinic No. 2 there will also be as many additional positions because of the freeing of two stories, now used as dormitories. This year a children's dental polyclinic will be organized here as well.

12525

CSO: 1840/595

COLLABORATION BETWEEN PUBLIC HEALTH AGENCIES AND INDUSTRY MINISTRIES

Moscow ZDRAVOOKHRANYENIYE ROSSIYSKOY FEDERATSII No 3, Mar 84 (manuscript received 30 May 1983, pp 6-10)

[Article by V. A. Krutikov, R. I. Abbakumova, A. P. Glotov (Moscow)]

[Text] Realization of the Food Program is a qualitatively new stage in the development of the USSR agroindustrial complex. The social rural reconstruction program developed for the present has no equal in terms of its many facets.

The development of agriculture under present-day conditions is accomplished on the basis of a qualitative improvement in its material and technical base and the overall mechanization and automation of the production of food products. The nature of labor in modern agriculture takes on industrial characteristics; labor conditions are determined by the level of mechanization, machinery used, crops grown, the technology of their reaction, and labor organization.

Energy-efficient tractors, self-propelled machines and interchangeable and pull-type equipment complexes to guarantee the performance of all technological operations dealing with crop cultivation form the basis of the machinery park in present-day agriculture. Modernization of the machinery park and creation of models of new highly productive and energy-efficient tractors and combines have increased labor productivity by a factor of 2.5-3. At the same time, this process leads to intensification of labor processes, increased neuromuscular tension and fatigue, an increase in the effect of adverse labor factors (noise level, vibration, heating of the air in cabs, increased dust formation). This is joined by a number of other factors having a negative effect on the body.

Modern highly productive equipment, energy-efficient complexes of machines and mechanisms and progressive technology are also being adopted in other sectors of the country's agroindustrial complex, such as the grain products and mixed feed industry, land reclamation, repair and service of agricultural equipment, rural construction, etc.

The assortment of agricultural products has been expanded, the amount of chemical substances provided for agricultural production has been increased and the quality has changed and the production of livestock and poultry products has been changed over to an industrial basis.

All of this indicates that concern for the health of agroindustrial-complex workers under conditions for fulfillment of the Food Program takes on special significance, in that health is an inexhaustible source of increased labor productivity. Hygiene education plays a role of no little importance in the campaign to improve the health of all Soviet people and their creative and occupational longevity. This is natural, since in the realm of disease prevention, the attitude of a man toward his health and the level of his health education have a very large, if not a determining influence.

Despite the fact that much has been done and is being done in the Russian Federation to raise the level of health knowledge among rural workers, a powerful network of health education institutions was developed and is very active (more than 400 health education centers and offices employing approximately 2000 physicians and midlevel medical personnel; approximately 25,000 persons handle the coordination of medical hygiene propaganda at therapeutic-prophylactic institutions and antiepidemic stations in the RSFSR). The task of worker health education and training would be extremely complicated without coordination of the work of public health agencies as well as institutions, enterprises and farms of the agroindustrial complex.

In order to provide an effective solution to health education problems of the population of the republic, the "Complex Plan of Basic Measures for Health Instruction and Education of the RSFSR Population from 1981-1985" was developed and is being fulfilled in the RSFSR; it is authorized by the board of the RSFSR Minzdrav [Ministry of Health] and approved by ministries and departments of the agricultural structure. The respective territorial plans are drawn up on the basis of this plan; directive documents regulating questions of health education of workers and employees are drawn up at ministries and departments. They reflect practically all questions dealing with worker health instruction and education in the current five-year plan: the incorporation of this problem into socialist competition, the organization of lecture propaganda, health reading and recreation rooms, health expositions, introductory health education and continuing education, the making of educational films, the development of programs differentiated as to occupation, health instruction for students at VUZes, tekhnikums and vocational and technical schools, (PTU's), etc. The directive documents give special attention to propaganda for a healthy lifestyle and the campaign against health-endangering habits.

Joint documents reflecting regional differences are developed and issued at local health agencies (health education centers) in cooperation with institutions, administrations and the aforementioned industries for the purpose of coordinating this work. Thus, a definite system for the administration of health education to rural workers has been developed and is in effect, based on an overall plan and central and local directives.

The problems solved by public health agencies are diverse and complex. They are: procedural training for the medical workers giving the instruction, the development of educational programs differentiated as to occupation, and the instructional process itself. Other smaller-scale programs also exist. Finally, the end result--the quality of health instruction--depends on health agencies alone.

A document published by the RSFSR Ministry of Land Reclamation and Water Resources should be singled out among the directive documents of the aforementioned agencies. It is a collection of procedural materials regarding health education for workers and employees of water resources organizations, containing a model program for health instruction and education of land reclamation workers developed by the Stavropol Kray health education center in addition to the order and procedural recommendations for instruction.

It should be mentioned that the republic health education center of the RSFSR Minzdrav participated in the correlation of all directive documents.

This work is directly carried out and controlled by main administrations and personnel administrations of the appropriate ministries and departments.

Study of questions concerning cooperation in rural worker health instruction and education has shown that this work is especially successful when the health instruction is regulated in an organized fashion, right up to the individual enterprise or farm (Volgograd, Leningrad and Kirov Oblasts, Chuvash and Bashkir ASSR's and many other territories of the RSFSR).

Close contact between interested parties and party, soviet and public organizations of enterprises, departments, institutions and farms should be considered an indispensable condition for rural worker health instruction and education.

In analyzing the cooperative work of public health agencies and health education centers concerning the health education of rural workers, it can be mentioned that certain work was done in this connection during the years of the 11th Five-Year Plan: a substantial number of lectures and talks were given, primarily at the workplace itself (on the farm, at the garage, in the field camp, at the repair shop, etc.). Many leaflets, pamphlets, posters, booklets and a lot of other mass literature in Russian and national languages was published.

For example, in 1982 in Stavropol Kray alone, 6236 lectures and 73,657 discussions were held for kolkhoz and sovkhoz workers. Also health education institutions are operating in Moscow, Amur, Omsk, Sverdlovsk and many other oblasts.

The basic form for the instruction of agricultural personnel is health instruction in 8-16 programs during the winter, and also training of

groups covered by decree (milkmaids, persons working with chemical agents for pest and weed control, mechanics, etc.). Propaganda for a healthy lifestyle as part of the socialist way of life is occupying an increasingly important place in the work of health agencies concerned with health education for rural workers.

Study of this work locally has indicated that the quality of the propaganda, its content and clarity have improved somewhat. Unfortunately, for a number of objective reasons, they still have not been successful in substantially changing the quality and increasing the quantity of the published mass hygiene education literature which is one of the significant shortcomings in the joint work of public health agencies and local organs of the agroindustrial complex for the health instruction of rural workers.

In turn, the industry ministries of the agricultural structure, handling party and state decisions on health care and guided by the "Comprehensive Plan of Basic Measures for Health Education and Instruction of the Population of the RSFSR from 1981-1985" and departmental orders made a significant contribution in 1981-82 toward increasing the health culture of the RSFSR population.

Thus, health instruction of management workers at enterprises of the RSFSR Ministry of Procurement is accomplished through the industry Institute for Skill Improvement of Managerial Personnel and Specialists, courses at tekhnikums and oblast curriculum combines.

A 20-hour health education program for workers and employees was developed jointly by specialists of the republic health education center and the Department of Labor Safety Regulations of the Institute for Skill Improvement.

In secondary special educational institutions of the industry and PTU's, health education is accomplished by taking a "Labor Safety Procedures" course. In addition, work on three-year health-universities has begun at tekhnikums with the active cooperation of local health organs.

The experience of worker health instruction at enterprises of the Sverdlovsk and Sakhalin Grain Products Production Administrations is interesting.

The RSFSR Ministry of Agriculture and its local organs devote a great deal of attention to the health education of kolkhoz and sovkhoz workers and specialists. In 1982 alone, 120 million rubles were spent for these purposes. Health-universities are actively working in rural areas, holding physician lectures and discussions and creating health reading rooms and expositions on health subjects. Continuous anti-alcohol and anti-tobacco propaganda is waged in cooperation with public organizations. A healthy lifestyle is being widely publicized; introductory health instruction is mandatory when starting a job.

The course "Hygiene Education and Raising the Health Culture of Agricultural Workers" is given during training for the mass professions of agricultural labor in schools of agriculture administration and schools for skill improvement with medical workers actively participating.

Subjects of a hygienic nature are included in curricula and programs for 87 occupations, including emergency care [skoraya pomoshch]. As a result of work done in 1981-1982 in the course network, instruction on the subject of health was given to approximately 2.5 million persons.

In 1981-1982, hygiene instruction was given to 202,500 agriculture managers and specialists at the All-RSFSR Institute for Skill Improvement and the appropriate departments at agricultural VUZes. In order to consolidate control over the status of labor safety procedures through local health education, in October 1982 the RSFSR Ministry of Agriculture issued an order for certification of chiefs of production central boards, association administrations and also their deputies and chief and leading specialists.

The RSFSR Ministry of Agriculture included questions of a hygienic nature in programs of PTU's, tekhnikums, courses for improving the skills of engineering and technical workers and production-technical education for workers. Qualified workers from local public health agencies are conducting these studies. In the 1981-1985 social development plans of all ministry enterprises and institutions without exception, a division for worker health instruction is provided for, in which particular attention is given to propaganda for a healthy lifestyle. Health expositions are well equipped with technical information facilities. Questions of worker and employee health education must also be considered in tallying the results of socialist competition.

In the Ministry of Forestry, the problems of hygiene instruction and education are solved like this: every year, 3000 future crane operators, bulldozer operators, tractor operators, and gasoline-powered saw mechanics studying at forestry technical schools also obtain health knowledge provided by a program of instruction.

Every year at the Institute for Skill Improvement, 3000 out of 4300 students study health subjects in an 8-hour program, and 100 persons study them in a 70-hour program. All workers and employees starting a new job undergo introductory instruction, and once a quarter they are given continuing instruction. Three out of eight hours of introductory instruction are devoted to health questions.

The work on hygiene instruction and education carried out within the system of statewide measures for strengthening the health of the rural population is bringing positive results.

In the opinion of the Ministry of Agriculture specialists, the declining number of injuries at agricultural enterprises of the RSFSR is explained to

a certain degree by active cooperation between health and agriculture agencies.

However, there are also serious shortcomings in the collaboration of health agencies and ministries of the agricultural structure, which complicate the accomplishment of this important work.

Thus, worker hygiene instruction and education programs differentiated by occupation are developed and implemented too slowly: in agricultural enterprises alone such programs need to be developed for more than 30 new occupations and reviewed for approximately 100 existing ones.

Hygiene instruction and education for workers at produce farm enterprises is still poorly done, especially that of greenhouse workers. We must not forget integration with Red Cross committees and industry trade unions; contact with them undoubtedly has a positive effect on the quality of health instruction and education of rural RSFSR workers. The joint development of procedural recommendations for anti-brucellosis propaganda by the republic health education center and the Central Committees of the RSFSR Red Cross and The RSFSR Ministry of Agriculture can serve as an example of creative cooperation. The accumulated experience of integration in work on health education of the rural population between health agencies and institutions of the agroindustrial complex indicates a pressing need for clear delineation of functions and duties, issuing of joint directives and procedural documents, improvement in work on improving the material and technical propaganda base, and most importantly the merging of this work with the system of party and political education.

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CERTAIN MEDICAL AND SOCIAL PROBLEMS OF AGING OF RURAL POPULATIONS

Moscow ZDRAVOOKHRANYENIYE ROSSIYSKOY FEDERATSII No 3, Mar 84 (manuscript received 25 May, 1983), pp 16-19

[Article by I. A. Gekht, Volzhskiy Central Rayon Hospital, Kuybyshev Oblast]

[Text] In recent years, the process of population aging has been taking place in our country; this is primarily the result of a decline in the birth rate. This process is especially pronounced in rural areas where it is caused not only by a significant reduction in the birth rate, but also by significant population migration, with the young contingent settling in the city.

A study of population makeup for purposes of discovering the number of old and elderly persons is extremely important for the organization of medical care for this group. Improving the level of health of old and elderly persons helps to extend the length of time that they are able to work and consequently to more fully use the work skills and experience that they have accumulated through the years. The food program adopted by the May (1982) CPSU Central Committee Plenum provides for an entire series of measures for the conservation and prudent use of labor resources in rural areas, in which medical workers have a great deal of responsibility. They are faced with new tasks, including improvement of the health of elderly people.

Volzhskiy Rayon, Kuybyshev Oblast is a major rural rayon near a city, located near an industrial city with a population of over a million. Characteristics of the geographic position of the rayon undoubtedly have an influence on the composition of those living and working there. Thus, a large number of young people work at industrial enterprises and institutions of the city, continuing to live in a rural area. This explains the relatively low percentage, 16.2 percent, of persons over 60 living in the rayon as compared with other rayons of the oblast. When the ratio of men to women on a pension is considered, it becomes clear that there are 3 women for every man and with increased age the proportion of women steadily increases. Thus, among those who have lived a long time (90 years and more) there are 6 women for every man. Reasons complicating the situation are consequences of the Great Patriotic War that are still being felt. Moreover, the mortality rate is higher among men than among women.

This can be explained by many factors, especially injuries and harmful habits. It should be kept in mind that a certain percentage of old and elderly men do not have families and single men are less disposed than women to live in a rural area and more often move out of the country to the city to live with relatives. Among people over 60 living in the rayon, 63 percent are from 60-69 years old, 29 percent from 70-79 years, 7 percent from 80-89 years and 1 percent, 90 years and older.

Intensive development of agriculture has been noted in recent years, but the growth of rural labor resources is still lagging behind this rate. Under these circumstances, continuation of labor activity of pension-age persons is extremely important. In Volzhskiy Rayon, 14.4 percent of men and 7.3 percent of women are continuing to work after leaving on pension. Among pensioners continuing labor activity 20.8 percent have a higher, secondary special or secondary education. At the same time, 25 percent of those persons reaching pension age and having a higher or secondary special education, i.e., those engaged in skilled labor, continue working at the previous place.

Analysis of worker composition at rayon kolkhozes made it possible to establish that in 1982 the proportion of working pensioners was 9 percent and even higher at individual farms--13-15 percent. The proportion of persons of pre-pension age proved to be rather high among kolkhoz workers (men, 55-59 years old; women 50-54 years old); this varied from 13-28 percent at different farms. In those kolkhozes where the percentage of pre-pensioners was high in 1979, the percentage of working pensioners has grown in 4 years. Thus, in 1979, at the Kolkhoz imeni Shevchenko pre-pensioners comprised 28 percent and working pensioners 4.6 percent; in 1982 the percentage of working pensioners was already 9 percent. A similar situation took shape at the Progress Kolkhoz, where 23 percent of workers in 1979 were persons of prepension age, and in 1972 the proportion of pensioners increased from 8.8 percent to 15 percent.

One might suggest that the high percentage of elderly people living in kolkhozes causes high morbidity, with a temporary loss of ability to work. It has become clear, however, that work disability due to disease and trauma are approximately four times lower among working pensioners than among farms as a whole. What has been said confirms that those in sufficiently stable health stay on and work after going on pension and that the main reason for stopping work is declining health. Only a small percentage of working pensioners use the hospital beds in the kolkhozes. For example, in 1982 only 12 percent of working pensioners used hospital beds at the Progress Kolkhoz. Nevertheless, the existing potential high morbidity among elderly working people forces medical workers to handle this contingent with special attention.

The aging of the rural population places new and complex tasks before health workers. Establishing geriatric offices at central rayon hospitals (TsRB's) is only one of the methods for improving the care of elderly and older people. For the time being, however, opportunities for opening offices such as these are definitely available everywhere; this indicates

the need for improving the level of geriatric knowledge among rural medical personnel.

It is known that in old age the adaptation processes of the body are significantly reduced and the probability of the onset of pathological processes arises. Thus, for example, we studied fibrinase activity, an important element of the blood circulation system in old and elderly persons, who were in a state of good health and had normal vital signs. It was observed that fibrinase activity rises sharply with age, which indicates a developing preparedness for coagulation, even in healthy elderly and old people. This means that physicians and feldshers must know this and other characteristics of an aging body, so as to correctly diagnose and treat diseases of old people and carry out effective prophylactic work with them.

Prescription therapy is widely used for the treatment of old and elderly patients. Meanwhile, all medications are potentially dangerous for these groups of patients. Unfortunately it must be confessed that practicing physicians are not well enough acquainted with geriatric pharmacology. Indeed, it has been shown that many medications can induce toxicity in old and elderly people, because the body's excretory functions decline with age and certain medications in the usual therapeutic dose produce a paradoxical effect in them. Side effects from the medicines are frequently manifested in elderly and older people and when compound powders, mixtures or certain compounds are prescribed, it is difficult to ascertain exactly which medication caused the complication. Finally, the prescription of medications to old and elderly patients must be accompanied by a patient and clear explanation of how to use the agent. One should also keep in mind that approximately 70 percent of old and elderly patients take prescribed medications incorrectly. This means that physicians and feldshers are confronted with a new task: to study the characteristics of the medicinal treatment of old and elderly people, so as to know how to administer effective care.

The aging of the population forces public health organizers to study different forms of medical care for old and elderly people. In the rayon polyclinic, the percentage of persons over 60 who saw internists was 21 percent and the percentage who saw surgeons was 12 percent.

Since in 90 percent of cases old and elderly people only see four kinds of specialists, internist, surgeon, neuropathologist and oculist, extra positions for these specialties should obviously be provided for on rural polyclinic staffs, according to the number of old and elderly people living in the service rayon. And if one realizes that old and elderly people have a greater need for specialized care and that its availability is decreasing, thought should be given to increasing urology, endocrinology and cardiology positions on TsRB staffs and to foresee the need for mobile physician care units for remote rural inhabitants.

The normative level of hospitalization still has not been attained in many rural rayons due to the lack of specialized departments and beds. It is

often difficult to send elderly patients to oblast institutions for inpatient treatment, therefore a large number of these patients must be cared for at home.

It is much more difficult to do this here than it is in the city where the uchastok service exists, since a large number of villages are located very far from the places where hospitals and outpatient clinics [ambulatoriya] are located, and where there is not regular bus or other communication. In this regard, it should be mentioned that it is difficult for an elderly patient to get to the hospital. In almost every village there are feldsher-midwife points which serve elderly and old people at home in their own villages. At the present time, a situation has arisen in the villages making it difficult to give skilled and specialized physician care to old people living in remote villages. At the same time, old and elderly people must limit their visits to feldshers.

In connection with the above, the need arises for instructing feldshers in the problems of medical care for old and elderly people and for the organization of a mobile service with teams of physicians for this group. However, under existing staff quotas it is extremely difficult to create permanent mobile physician brigades, since only one specialist is provided for a TsRB staff of average capacity in rural rayons with a population of 20,000-40,000 persons--oculist, neuropathologist, otorhinolaryngologist, cardiologist, etc. And if we consider that these specialists are extensively involved in conducting prophylactic examinations of the population, it becomes clear that they have no time left for going out into rural areas regularly. Realizing that the process of aging of the rural population is continuing, well-timed adjustments must be made to rural institution staff schedules based on this phenomenon.

Problems in giving emergency care are especially important. Thus, from 1980-1982, 39-46 percent of medical care visits were for persons over 60. In 1982 there were 2.5 emergency calls for every rural inhabitant aged 60-69; 2.9 for those from 70-79 and 6 for those 80 years and older. These data indicate a need for the rapid development and improvement in emergency medical care in rural areas. Our rayon has six emergency care points in seven physician uchastoks, which has significantly improved emergency care for old and elderly persons. Telephone service and asphalt roads have undoubtedly enabled the improvement in organization of timely and quality emergency care for the old and elderly.

One more important circumstance should be considered in the organization of medical care for old and elderly persons in rural areas: a significant number of single old and elderly people live in rural rayons. Several of them live with children or other relatives, others live independently in private homes without conveniences and they take care of themselves.

The presence of a large number of single old and elderly people in the village complicates their medical care. The role of frequent home visits to them by physicians and feldshers increases, as does the need for hospitalization of the sick. At hospitals for old and elderly people,

bed-days are artificially extended, since there is no one to care for these patients at home.

It should be mentioned in conclusion that the demographic situation evolving in rural areas is forcing public health organizers to study characteristics of the medical care of old and elderly people, and to organize education of physicians and medical workers of the secondary team in gerontology and geriatrics problems.

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LENGTH OF TIME SPENT BY PATIENTS IN ADMITTING DEPARTMENT OF
EMERGENCY MEDICAL CARE [SKORAYA POMOSHCH] HOSPITAL

Moscow ZDRAVOOKHRANYENIYE ROSSIYSKOY FEDERATSII No 3, Mar 84 (manuscript
received 1 April, 83) pp 23-25

[Article by K. N. Simonyan, V. G. Zaytsev, N. M. Dmitriyeva, V. N. Komarov,
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[Text] Improvement in the organization of the treatment and diagnosis
process at a hospital for emergency medical care (BSMP) has created a need
for the development of scientifically based recommendations as to optimum
lengths of stay in the admitting departments of these hospitals [statsionar]
for emergency patients and victims.

These time periods reflect many aspects of the work of the BSMP admitting
department and can be used as one of the basic criteria for evaluating
their work. However, only isolated data on this question are encountered
in the literature; moreover, they are extremely contradictory.

The need for the present study arose in connection with the establishment
of a model for the organization of care for patients with sudden illnesses
and injuries at a large city BSMP.

Optimum lengths of stay for emergency patients and victims at the BSMP
admitting department were determined during implementation of a
comprehensive program for further improvement of specialized hospital care
for this group of patients in a noncategorized city.

The study was done over a full calendar year at the Municipal Clinic
Hospital for Emergency Medical Care No 7, Moscow (1660 beds). A special
procedure was developed for its implementation and appropriate methods
for starting data accumulation and processing were used.

The required information was copied from the disease histories and
hospitalization order journals into a specially developed chart for the
person entering the BSMP admitting department.

As results of the study have shown, it is advisable in the practice of
public health to use broad parameters for lengths of stay for emergency

patients and victims in the admitting department of a multi-profile hospital and to grade them according to the following time parameters: under 30 minutes, 30-60 minutes, 1-2 hours and more than 2 hours.

According to results of a study done (see table) at the BSMP admitting department, 30.06 percent and 52.08 percent of emergency patients admitted were within the range of less than 30 minutes and 30-60 minutes.

For 15.09 percent of patients, there was a 1-2 hour period between admission and direction to hospital departments; 2.83 percent of patients with various types of emergency illnesses and injuries waited over 2 hours. At the same time, according to data of expert analysis, the optimum length of stay at an admission department is as follows: less than 30 minutes - 39.73 percent; 30-60 minutes - 58.33 percent; 1-2 hours - 1.94 percent. It should be mentioned that 77.5 percent of emergency patients and victims are judged to be in serious condition and are sent out of the department, and the rest are released within an hour from the time that they were admitted to the evaluation phase of medical care.

Definite variations are noted between actual and optimum lengths of stay for patients in the admission department in the case of different sudden illnesses and injuries; the maximum variations are noted in the case of acute surgical pathology and accidental injuries.

It was established that longer optimum periods in the admission department existed for 19.7 percent of those needing emergency hospitalization in beds of a various profiles. This indicator reflects the specifics of BSMP work and is usually explained by the simultaneous admission of a significant number of patients with an identical form of pathology, the need to follow different instrumental diagnostic procedures, a strong demand for consultative help, etc. A long wait for emergency patients at the BSMP admission department was principally caused by a gap between the administration of individual elements of the examination and the fact that physician-consultants were busy because of the heavy load placed on the staff of that department. In the majority of cases, these causes were due to lack of a special staff schedule for emergency medical care hospitals, and particularly for its diagnostic and auxiliary services. Specifically, 13.74 percent of emergency patients and victims were detained in the admitting department because of prolonged decontamination, lack of facilities for prompt transportation as designated, and other organizational features unrelated to therapeutic and diagnostic care.

Optimum times for emergency patient and victim lengths of stay at a BSMP admitting department can be completely maintained by around-the-clock work at this stage on the part of physicians in 6 clinical specialties (internist, surgeon, gynecologist, urologist, traumatologist, neurosurgeon or neuropathologist, X-ray specialist and physician-laboratory worker), and by creation of the conditions necessary for carrying out special instrumental methods of investigation.

In order to reduce the proportion of unwarranted long waits for emergency

Table. Actual and Optimum Lengths of Stay for Emergency Patients in the Admitting Department of a BSMP (Percentage of Total)

<u>Specialization</u>	<u>Length of Stay in Admitting Department</u>			
	<u>Under 30 min</u>	<u>30-60 min</u>	<u>1-2 h</u>	<u>Over 2 h</u>
<u>Actual Times</u>				
Surgery	24.28	56.86	17.15	1.71
Internal Medicine	24.10	57.59	16.25	2.06
Urology	33.33	46.93	14.91	4.83
Gynecology	39.59	47.11	9.39	3.91
Traumatology	25.25	55.94	16.34	2.37
Neurosurgery	33.85	47.92	16.14	2.09
<u>Total</u>	30.06	52.08	15.03	2.83
<u>Optimum Times</u>				
Surgery	35.34	63.83	0.83	--
Internal Medicine	33.43	64.56	2.01	--
Urology	37.19	59.114	3.70	--
Gynecology	45.91	52.12	1.88	--
Traumatology	42.25	56.25	1.50	--
Neurosurgery	44.20	54.06	1.74	--
<u>Total</u>	39.73	58.33	1.94	

patients and victims in the admitting department of Municipal Clinic Hospital for Emergency Care No 7, Moscow, a required set of organizational measures were devised and adopted. In them a great deal of attention was given to reduction in times from the moment this group of patients were admitted to the beginning of the primary physician examination, as well as to appropriate consultations and various methods of instrumental diagnosis.

A special dispatch station was organized at the admitting department, staffed by midlevel medical personnel (feldsher, medical nurse [sestra]) for rapid and qualitative primary medical triage and the calling of physician-consultants and laboratory workers, and also for control over prompt evacuation of emergency patients to beds of the proper department. The station is equipped with different types of internal communication and is in operation around the clock.

Reduction in the lengths of stay for emergency patients admitted to hospital treatment has been facilitated by the development of scientifically based volume indicators of therapeutic and diagnostic measures for patients with emergency diseases and injuries, as well as by the use of various NOT [scientific organization of labor] elements in the

work of the admitting department of an emergency medical care hospital.

In conclusion, it should be mentioned that 98.06 percent of emergency patients and victims should be sent from the BSMP admitting department to the next stage of treatment in an hour. Within 30 minutes, 77.5 percent of patients in serious condition with emergency diseases and injuries should be transferred from this department and hospitalized. Promptness of hospitalization of emergency patients for the next stage of treatment was the result of properly organized triage, the adoption of modern methods of communication, round-the-clock work by physician specialists in the admitting department, and the adoption of a scientifically based range of instrumental examination procedures under various pathological conditions.

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CERTAIN QUESTIONS REGARDING IMPROVEMENT OF PATHOLOGICOANATOMIC SERVICE

Moscow ZDRAVOOKHRANYENIYE ROSSIYSKOY FEDERATSII No 3, Mar 84 (manuscript received 18 Nov 82), pp 25-28

[Article by V. A. Minyayev, T. B. Zhuravleva, I. V. Polyakov, V. Z. Klechikov, N. G. Petrova, Faculty of Social Hygiene and Health Organization (chief--Professor V. A. Minyayev) and Pathologic Anatomy (chief--Professor T. B. Zhuravleva) of First Leningrad Medical Institute imeni Akad. I. P. Pavlov]

[Text] Increasing the skills of physicians and improving the quality of medical care offered to the population are among the principal tasks in the future development of the public health system.

Pathologicoanatomic research is a basic objective criterion of the quality of diagnosis and treatment and its role as a means of verification is constantly increasing as a result of the spontaneous and therapeutic pathomorphism of many diseases, the appearance of new diseases, the intensified effect of medicine on the human body as a result of the development of intensive therapy and reanimation methods.

At the present time, in addition to solving the traditional problems (correlation of clinical and pathologicoanatomic diagnoses, establishment of true causes of death), the pathologicoanatomic service must decipher in greater detail the mechanisms causing death, those that have been known for a long time as well as for new diseases; they must also identify iatrogenic pathology and study its causes.

The study of the causes and mechanisms of death, pathogenesis and pathomorphism of diseases at the current procedural level is hindered by posthumous changes in the organism: hypostasis, beginning autolysis, structural anomalies in parenchymatous elements and fibrous structures, and false activation or suppression of enzyme activity.

Meanwhile, the intense development of biology on the basis of achievements of the exact sciences (physics, chemistry, mathematics) opens up extensive opportunities for the adoption of functional-morphological analysis methods in diagnostic research, both living and posthumous.

Quantitative histoenzymologic studies done from 1979-1982 at the I Leningrad Medical Institute (I LMI) proved that there are practically no posthumous changes in the first hour after death. It was determined that during this period, the intracellular metabolism of practically all parenchymatous organs is maintained at a stable level, with insignificant, statistically unreliable deviations, which establishes an opportunity for analysing the condition of the organs and systems in the terminal period. This served as a basis for performing pathologicoanatomic dissections during the first hour after biological death (emergency autopsies).

The pathologicoanatomic service was reorganized for this reason, making it possible to perform emergency autopsies. The pathologicoanatomic department was transferred over to a 24-hour work schedule.

Experience has shown that organization such as this has an undoubted advantage, primarily that study of the section material taken during the first hour after death, using contemporary morphological methods, gives objective information about the functional state of the organs and systems, corresponding to the terminal period. This enables cellular, subcellular and molecular-level analysis of death-causing mechanisms as well as evaluation of drug effects, reanimation measures and the nature of intensive therapy. The latter has great applied significance, since it enables an adequate evaluation of the quality of not just the diagnostic but also the therapeutic performance of a hospital.

Moreover, taking material and blood from a cadaver during the first minutes after death and keeping it at low temperatures opens up real opportunities for the creation of organ banks, necessary for the solution of many problems of biology and medicine.

Organization of 24-hour operation for the pathologicoanatomic department with the performance of emergency autopsies requires no changes in the departmental structure, including the dissection block with the morgue, pathohistological laboratory, archives, museum, etc.

The fundamental difference between the technical portion of the emergency autopsy and that of the normal one is that the first one begins with the taking of material. For this the dissection room must have an ASD-16 or ASD-32 Dewar transport flask with liquid nitrogen, a glass cylindrical Dewar flask with with a 1-liter capacity or a standard wide-mouth thermos and Dewar flask with dry ice if the material is going to be stored in it later, or a Khar'kov-34A cryobiological flask if the material is to be stored in liquid nitrogen. Freezing is done in isooctane, aviation gasoline or freon, and condensed liquid nitrogen. Keeping the material in Dewar flasks with dry ice guarantees that the biological properties will be maintained for up to 6 months, and with the use of nitrogen tanks---practically forever.

Morphofunctional analysis of the tissue samples obtained in this manner is done through histochemical and histoenzymologic reactions on nonfixed sections 10 microns thick, prepared on an MK-25 microtome-crystate or a

Krio-kat microtome. Preparation of the organ specimens and performance of the reactions themselves was done according to generally accepted procedures, modified somewhat at the I LMI Faculty of Pathologic Anatomy for use with human tissues.

Sections obtained in this manner are suitable not only for exact microscopic diagnosis in stable compounds stained with hematoxylin and eosin, but also for studying the content of proteins, mucopolysaccharides, fats, nucleic acids and for a qualitative determination of the activity of practically all enzymes. Domestically-produced apparatus (MPF-5, MTsF-U2, etc., apparatus) is used for the quantitative analysis. When necessary, this same material can be examined by using an electron microscope.

Round-the-clock operation of the pathologicoanatomic department with the performance of emergency autopsies is possible in a hospital with a capacity of no less than 800-1000 beds, with centralized transportation of cadavers from the clinical departments. In order to do this, there must be no less than 12 orderly [sanitar] positions on the staff of the pathologicoanatomic department. Under conditions of 3-5 deaths per day, a staff of orderlies such as this will be able to deliver cadavers to the pathologicoanatomic department from a territory of even a large hospital area, provide the technical portion of the dissection, run various errands to guarantee the operation of the histological laboratory, and provide sanitary clearing of the area. The optimal alternative is having 13 orderlies available.

The laboratory worker's job is done only in the daytime (from 9:00 a.m. to 2:00 p.m. for a 6-day work week and from 9:00 a.m. to 3:00 p.m. for a 5-day week). In this regard the principle of sliding distribution of the day-to-day production work of the laboratory worker is used. For three months every laboratory worker is assigned a day of the week on which he takes in and performs planned biopsies and prepares immediate preparations for intraoperative diagnosis. In the days to come, this same laboratory worker works on all of the material that he has collected, which increases his personal responsibility for the quality of the preparations. All remaining work is distributed equally among all laboratory workers. When there are seven or more laboratory workers on a staff, it is advisable to single out the most experienced ones for the preparation of reagents and the performance of complex stainings, histochemical studies, and for checking the times and quality of the work of the other laboratory workers.

The physician staff works from 9:00 a.m. to 2:00 p.m. on the cycle principle. A cycle is made up of 3-4 weeks. During the 4-week cycle, for one week the physician works on intake and performance of planned and emergency biopsies; the second week (inspection) is used for histologic study of the previously done biopsies. During the third (duty) week, the physician completes diagnosis of the complex biopsies requiring additional staining or serial sections in the course of the study, consults with patients, and when necessary substitutes for other physicians in the department (during a 3-week cycle, this week is not included in the schedule). In the course of this week, the dissector is responsible for

the performance of dissection work from 9:00 a.m. to 2:00 p.m. At 9:00 a.m. he familiarizes himself with results of the dissections performed from 2:00 p.m. to 9:00 a.m., in order to use them for demonstration in clinical-anatomic reviews.

From 2:00 p.m. of the current day to 9:00 of the following day, emergency dissections are done by the pathologist/anatomist on duty. Information regarding all deaths is reported on by the hospital physician on duty who, after recording biological death in the disease history is obliged to send a telephone message to the pathologicoanatomic department, where the dissector takes it. The following columns are contained in the registration journal: date and time of the report, clinic, last name, first name and patronymic of the deceased, time of death registration, disease history number, age and sex of deceased, clinical diagnosis, last name, first name and patroymic of physician on duty, note. These data are sufficient for the performance of a survey dissection. The disease history is submitted on the morning of the following day (no later than 10:00), which gives the dissector the opportunity to familiarize himself with the history of the disease to study the posthumous clinical epicrisis, and when necessary to conduct a number of additional studies (morphometry, histologic examination of cryostatic sections, etc.).

The autopsy protocol begins to be formulated immediately during the autopsy. Its final formulation (including pathologicoanatomic diagnosis and epicrisis) is done after the clinical-anatomic review.

Since clinical-anatomic examinations are not held on days off and holidays since the treatment physicians are not there, then 24-hour physician duty periods for the performance of emergency autopsies should be held from Monday (after 9:00 a.m.) to Saturday (until 2:00). During the time remaining (from 2:00 p.m. on Saturday until 9:00 a.m. on Monday) just 2 orderlies can be on duty, transporting cadavers from clinical departments and putting them into a refrigerated chamber.

Clinical-anatomic reviews of all dissection cases for the elapsed 24 hours are held at a definite time: from 11:00 a.m. to 12:00 noon (or at any other hour if this is not connected with the teaching process) with the required participation of treatment physicians and all pathologist-anatomists. Since the technical portion of the autopsy is conducted beforehand and the dissector has already familiarized himself with the history of the disease, then special attention can be devoted to the theoretical aspect of this case during the review. This increases the role of clinical-anatomic reviews at the dissection table, makes them more careful and informative and moreover cuts down the time, allowing demonstration and joint discussion of 3-4 cases of death in an hour.

Thus, emergency autopsies significantly raise the level of morphological diagnosis of diseases, making it possible in each specific case to detail the mechanisms of cause of death and to retrospectively evaluate the patient management tactics during the terminal period. On the whole, functional-morphological analysis of the condition of organs and systems in

correlation with clinical and laboratory data is a qualitatively new stage in clinical and morphological work; it helps to raise the quality of patient diagnosis and treatment.

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FORMS AND METHODS OF COMBATTING ALCOHOLISM IN COUNTRIES OF
WESTERN EUROPE

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received 3 January, 1983) pp 40-43

[Article by D. K. Sokolov, Department of Social Hygiene and Health
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[Text] According to WHO data (1981), the level of alcohol consumption has
significantly risen in all countries (Although this indicator has remained
stable in France, it remains at a high level; see table).

Depending on economic and geographic characteristics, levels of culture and
other factors, each country is taking measures to combat alcoholism. At
the same time, 24 countries have worked out general organizational and
procedural approaches to control alcohol abuse, which were consolidated at
the 294th session of the Committee of Ministers of the Council of Europe.

It was observed that alcohol has a destructive effect on the physical and
mental health of an individual and on members of his family, greatly harms
the country's economy, and causes an increase in injuries. It is
impossible to solve the problem of alcoholism through strictly medical
measures. To do this, they need to be combined with social, educational
and legal measures, means and programs carried out by the state and by
public and volunteer organizations. These programs must reach not only
alcoholics and members of their families, but all those who are
experiencing social, physiological and psychological difficulties as a
result of the abuse of alcoholic beverages.

The essence of these programs is to insure cooperation between health
institutions and other social and charitable services according to the

*Council of Europe. Committee of Ministers. Resolution N (78)46
Alcoholism: Measures of Prevention. Strasbourg, 1978.

following divisions: early identification of persons suffering from alcoholism, evaluation and treatment of the various stages of alcoholism, rehabilitation of patients and subsequent followup of them, help for families, staff training in patient care, implementation of prophylactic measures, increase in the level of medical education, and explanation of the harmfulness of alcoholism and the importance of treatment.

In the majority of pathological changes and diseases related to alcohol ingestion, patients are treated at primary medical care institutions or at general profile hospitals. Psychiatric services give care only in those circumstances when serious changes from a psychiatric aspect are observed. Thus, in the countries of Western Europe there are not many narcological offices and specialized institutions for the treatment of alcoholic patients.

Special programs for the prevention, treatment and control of the spread of alcoholism exist in only certain countries, where a great deal of attention is given to somatic, psychological and social factors. Unfortunately, often these programs are of a declarative nature, since they have no material base. They do not attach a sufficient amount of importance to such cultural and social factors as housing conditions and job security. Propaganda plays a large role in the campaign against alcoholism, particularly population information concerning the harmful effect of alcohol on children and adolescents. Scientific studies conducted in this area are primarily directed toward identifying factors promoting the spread of alcoholism and drug addiction, and toward a search for measures to prevent them. In the countries of Western Europe, particularly those where a large amount of alcoholic beverages are produced (Austria, France, Italy, Greece, etc.), foremost attention is given to providing continuous medical care to alcoholic patients.

Short-term inpatient hospital [statsionar] treatment of patients with alcoholism with subsequent followup on the part of the community and family is of primary importance. Patient care is provided either by medical or social services or charitable organizations.

Persons who need to go through a period of adaptation to general life before returning to their families after treatment for acute or preacute alcoholism as well as the homeless sometimes are granted general living quarters or a room at a hotel with access to rehabilitation workshops for social and occupational adaptation.

Specialized departments for the treatment of alcoholism, including the outpatient clinic [ambulatoriya] and inpatient hospital are called upon to play an important role in changing patient behavior, since they are a source of expertise, through education and the carrying out of scientific studies on this problem. If an individual experiencing difficulties due to alcohol consumption is looking for medical care, he is given the opportunity of treatment, which is provided by public or private services. These services are either rendered without charge or are paid for by public, private or combined insurance programs. Unfortunately, sometimes this aspect is only complied with in cases where persons are covered by social insurance (Denmark, Sweden, etc.).

Table. Alcohol Consumption in Several European Countries (In Liters of Pure Alcohol Per Inhabitant Per Year)*

<u>Country</u>	<u>1960</u>	<u>1972</u>	<u>Country</u>	<u>1960</u>	<u>1972</u>
Austria	8.7	12.4	Italy	12.2	13.6
Belgium	6.4	9.3	Luxemburg	8.3	11.5
Denmark	4.2	7.7	Holland	2.6	6.4
Finland	1.8	5.1	Norway	2.5	3.8
France	17.3	16.8	Portugal	10.4	11.7
FRG	6.9	11.0	Spain	6.5	11.4
Greece	5.2	5.4	Sweden	3.7	5.8
Ireland	3.4	6.0	England	5.1	6.9
Iceland	1.7	2.8	Switzerland	9.8	10.8

*Health Services in Europe. Copenhagen, 1981.

Note: Comparative materials for more recent period not published.

Alcoholism treatment must be based on the desire of the patient. To infringe upon an individual's right to refuse treatment should be done only in the case where this person presents a direct threat to the life of those surrounding him or if the patient's mental health is damaged and he has become dangerous to himself. Under circumstances such as these, a decision regarding the alcoholic patient must be made by the psychiatric and judicial services with the cooperation of the family.

In the process of the treatment of people abusing alcohol, the health of the members of his family should also be considered, since the latter belong to a high-risk group. Considering that many patients with alcoholism are of working age, they should be engaged in socially useful labor during the treatment process. Principal efforts have been directed toward the early detection and treatment of alcoholism through the resources of existing occupational programs, and toward guaranteeing that rights of the alcoholic be protected (It is important that a man suffering from alcoholism not lose the right to work and to be useful in production, both during and after treatment).

In the second group of countries not exporting alcoholic beverages, a great deal of attention has been devoted to limiting the supply, sale and advertising of alcohol in addition to measures to curtail demand for alcoholic beverages. These measures provide for the elimination of social and economic factors which can determine or affect the development of alcoholism.

In a number of European countries (i.e., Denmark, Sweden, etc.) relatively high prices are maintained for alcohol, so as to limit its consumption.

In different countries central agencies for medical education have been

established, adopting measures for the prevention of alcoholism. In isolated cases, coercive measures are used for the treatment of alcoholic patients.

In principle, the use of police and penal measures (including force) against alcohol abuse is not encouraged, since this results in the problem being transferred from the realm of public health to that of criminal law, which is ineffective.

Individualized approaches are being sought, for the mass of population in general, as well as for groups at high risk.

Measures are being taken to make graphic guides, literature, films and other instructive materials more accessible; they will serve as the force of the fundamental anti-alcohol propaganda, particularly when implemented by schoolteachers, medical and public services personnel, charitable organizations and mass information facilities.

Prophylactic measures are divided into three directions and are considered a part of treatment. The primary prophylaxis of alcohol abuse provides for solution of a broad circle of problems of society through the help of medical science and public policy. The secondary prophylaxis focuses attention on early recognition and treatment of alcoholism. The third prophylaxis is related to rehabilitation and subsequent patient followup, particularly important with alcoholism, in view of the fact that diseases often have a recidivistic nature, and do not always result in stable health.

Alcoholism treatment requires changes in the attitude of an individual toward alcohol and contains the following measures: psychological appointments (oriented toward an understanding of the individual), at which time the appropriate recommendations are made to the patient and the members of his family; organization of appointments, changing the behavior of the patients. They include classic (alcohol aversion) and effective regulation of the state of the organism.

Both of these types of methods can be used on an individual or a group basis. Regardless of the type of medicine taken during alcoholism treatment, individual treatment is not as promising as group (group therapy, psychotherapeutic social methods, family therapy, special therapy culminating in alcohol intolerance). In the case of intoxication by intermediate products, the method of suppressing alcohol oxidation using the chemical inhibition of enzymes is used. This type of treatment should only be used as a supplement.

The use of psychotropic medications makes it possible to control mood swings and to eliminate anxiety, stress, psychic manifestations, and psychomotor psychosomatic disorders with alcoholism. Moreover, certain

*In a number of Western European countries, health and medicine come under the jurisdiction of the Ministry of Internal Affairs, which also controls enforcement agencies (police, etc.).

conditions leading to drunkenness (such as anxiety and depression) can be effectively treated using psychotropic agents.

It should be mentioned that the basic factor inhibiting timely treatment of alcoholism is the incorrect attitude of society toward this problem (blaming victims of alcoholism, judging them, lowering their human dignity). This prevents the patient from seeking medical care, causing him to cover up his ailment. The attitude toward this problem must be changed by the fact that a desire to help must prevail over judgment.

The importance of alcohol research is admitted in all countries. Scientific studies are being conducted concerning epidemiology, morbidity, mortality, medical and social problems. The biological aspects, particularly predisposition to alcoholism have not been ignored.

At the present time, when alcohol consumption by the population has increased in all countries and is threatening the health of society, the following tasks have priority: the conducting of fundamental and applied studies on alcoholism, including biochemical, neuropsychophysiological, sociohygienic and economic; identification of a correlative dependence of alcoholism on uncertainty regarding the future, qualitative and quantitative indicators of production, increased unemployment, the distribution and relative cost of alcoholic beverages; determination of treatment effectiveness, not only from the standpoint of medicine but from the material and moral losses borne by society as a result of alcoholism (injuries, accidents, etc.); evaluation of the effectiveness of treatment and followup in order to find accompanying circumstances; identification of the etiological role of alcohol as a factor in violent and sexual crimes; establishment of a connection between alcohol consumption and accidents on the road, at work and at home, particularly in light of increased mechanization; determination of the significance of alcoholism in maintaining a destructive and unhealthy lifestyle.

These directions, approved by the Committee of Ministers of West European countries, establish the horizons for the campaign against alcoholism.

It is difficult to say whether real successes will be attained in this campaign, since many reasons leading to alcoholism continue to exist (such as unemployment, exploitation of man by man, the housing problem, the relative impoverishment of the working masses, lack of supervision of children, etc.). Moreover, intensification in preparation for war in a number of capitalist countries and uncertainty about the future also have their negative effect.

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RSFSR MINISTRY OF HEALTH PROBLEM COMMISSION ON MEDICAL
DEMOGRAPHY

Moscow ZDRAVOOKHRANYENIYE ROSSIYSKOY FEDERATSII No 3, Mar 84 pp 43-45

[Article by A. A. Popov, learned secretary of the Problem Commission on
Medical Demography]

[Text] In 1983, sessions were held of the RSFSR Ministry of Health Problem
Commission on Medical Demography; the most pressing questions of the study
of state of health were discussed and measures for improving medical-
demographic processes were recommended.

The psychological aspects of working as an emergency care [skoraya
pomoshch] physician were discussed at one of the sessions. Candidate of
Psychological Sciences A. A. Veretennikova (Moscow Scientific Research
Institute of Emergency Care imeni N. V. Sklifosovskiy) gave a report on
this question; she indicated the practical need for creating a psychology
service within the public health system. Psychological studies help to
solve current problems in public health organization such as training
skilled medical worker personnel, improving their professional skill in
carrying out their work, forming professional steadiness and stability in
personnel. At the present time there are no scientifically based
psychological criteria for professional selection in the health field.
However, as noted by the speaker, not just any graduating student can
become a physician, and not just any medical VUZ graduate can be a good
specialist in the different areas of medical practice.

The specific nature of the professional activity of physicians in various
specialties is shown in this. The speaker further discussed the
psychological and psychophysiological characteristics of the professional
activity of an emergency medical care physician that were discovered in the
course of the study; they form the psychological basis of the
professiogram--a summary of the most significant demands presented by the
profession to a person. Study results have shown that the psychological
demands for the occupation of mobile unit emergency care physician assume
first of all a high level of development of efficient thought, emotional
stability and social competence.

Results of the study of the status of the psychological health of emergency

service physicians were presented in the second part. It was found that only part of the emergency service physicians questioned were within normal healthy personality limits. Deviations in the psychological health status of physicians were treated by the speaker as a consequence of their lack of adaptation to the specific work done in the emergency service and the inadequacy of the psychological characteristics of their personality to meet the demands of this profession. It is specifically this group of physicians that is responsible for high personnel turnover in the emergency service system.

The speaker noted the practical significance of further study of the characteristics of the professional activity of physicians of various specialties, and the development of scientifically based general medicine and highly specialized professiograms.

Doctor of Medical Sciences Yu. M. Komarov and Candidate of Medical Sciences M. M. Verentsov took part in the discussion; they mentioned the importance of accomplishing these tasks for public health. The final result of professional orientation and professional selection based on psychological criteria allows a significant increase in the quality of the medical service and a reduction in personnel turnover, which will help in the fulfillment of current tasks for improving public health.

I. S. Chumareva, an associate of the Faculty of Social Hygiene and Health Organization of Izhevsk Medical Institute gave a progress report on her candidate's dissertation on the subject "The Medical-Demographic Situation and its Future in the Udmurt ASSR." The goal of this study is to evaluate the state of health and reproduction of the population of the Udmurt ASSR in connection with sociohygienic and medical factors, and also to develop scientifically based recommendations of an organizational and sociohygienic nature.

In order to fulfill this task, the medical demographic processes in the Udmurt ASSR from 1970-1979 were studied in detail by the speaker, a basis was given for dynamics prognosis in order to improve the quality of prophylactic and therapeutic medical care for patients, an in-depth study was done of causes of death of the working-age population and the quality of medical care.

Further, a tentative evaluation of population reproduction after elimination of observed shortcomings was given by the speaker. The final goal of the study was the development of recommendations for improving the organization of prophylactic and therapeutic work, intended to bolster the health of the able-bodied contingents.

Professor I. S. Yag'ya, Doctor of Medical Sciences and Assistant Professor I. V. Lebedeva spoke, analyzing I. S. Chumareva's report; they remarked on the importance of the in-depth study of regional characteristics of medical demographic processes in connection with sociohygienic factors and the nature of organization of the medical service.

It was noted at the session that the results obtained by the study can be

used as the basis of a regionally differentiated development of recommendations of an organizational and sociohygienic nature, intended to improve the organization of medical care and to provide preventive dispensary observation among different working-age contingents.

A report by L. N. Babaka, chief physician of the republic Sanitary Aviation Station of the RSFSR Minzdrav, was heard on tasks and prospects for the development of emergency and routine-consultative medical care of the RSFSR population.

The lecturer observed that in 1984 it will be 50 years since the organization within the system of public health agencies of sanitary aviation subunits [podrazdeleniye]. Consequently, the sanitary aviation stations were reorganized into emergency and routine consultative departments, with the tasks of organizing and carrying out emergency and routine-consultative flights (trips) in order to provide the population with medical care through the efforts of qualified physicians. It was observed that in 1982 emergency and routine consultative care was given to 430,000 patients and victims. In 1982 more than 600,000 patients were seen by physicians of oblast (krai, republic) hospitals, traveling to give routine consultative care. This is why it was specifically mentioned in the report that the involvement of qualified specialists of oblast hospitals, medical clinics and scientific research institutes in consultative work makes it possible to bring specialized medical care closer to the population of remote rayons of the country.

In conclusion, L. N. Babak informed the audience of prospects for developing an aviation health service in the Russian Federation.

As Professor M. S. Bedniy, chairman of the Problem Commission noted in his speech, science is clearly indebted here to practice, although the task of bringing skilled medical care to the population of remote rayons is extremely important; aviation health service plays a large role here.

Assistant Professor G. N. Tsarik (Kemerovo Medical Institute) and Deputy Chief Physician of Kirov Central Rayon Hospital, Kaluga Oblast, I. P. Polyakov spoke at the second session of the Problem Commission on Medical Demography held at the beginning of November, 1983.

G. N. Tsarik's report "Status and Evaluation of the Mental Health of Various Contingents of the Population" treated current questions of the occurrence and dynamics of neuropsychiatric disorders which, in the opinion of the lecturer, are closely related to the formation of a noninfectious type of pathology, the aging of the population and other demographic processes. The problem of early detection and prevention of these diseases is very important because of the observable tendency toward an increase in neuropsychiatric disorders, particularly neuroses. An even more important task is that of the study and evaluation of the status of the strictly psychiatric health of the population as well as the borderline neuropsychiatric disorders. This is exactly why the main goal of the study whose results were presented by the problem commission was the development

of a scientifically based system of special measures to protect and strengthen the mental health of workers on the basis of a comprehensive study of the sociohygienic aspects of marginal neuropsychiatric disorders and psychoadaptation to conditions of modern industrial production.

Materials of the study presented clearly indicate that the frequency of onset of neurotic reactions is significant in modern highly traumatic production conditions. Moreover, their frequency increases according to length of service, complexity of labor, and mental and emotional strain and depends on a number of social and personal factors.

Professor B. D. Petrakov participated in the discussion of the report. He focused the attention of those present on the fact that an increase in the extent of neuropsychiatric illnesses is one of the pressing public health problems on a worldwide scale. The lecturer treated the dynamics of these diseases as a consequence of the adaptation process and the lack of adaptation of man to conditions of fast and stressful life tempos, a reaction to the negative consequences of urbanization.

It is for just this reason that public health is faced with the problem of the development and implementation of not only strictly medical preventive measures for the prevention of neuropsychiatric disorders, but also the problem of the scientifically based adoption of those social measures that would make it possible to maintain mental health, and would not allow human the adaptation capabilities to fail.

In conclusion, it was shown that the most important medical demographic problem in this area is the study of mental health, its criteria, and limits to the adaptation capabilities of the human psyche. From this standpoint, the work done by G. N. Tsarik merits approval as a timely and valuable direction of scientific and research work for public health.

I. P. Polyakov gave a report on the subject "State of Health of Adolescents." The health and labor activity of the population depends to a large degree on the conditions and manner in which the health of children and adolescents is formed. The knowledge of factors actively influencing the state of health predetermines ways and methods of improving therapeutic and prophylactic care for the population, aimed at eliminating those among them with a negative effect on the health of children and adolescents.

For this reason I. P. Polyakov conducted a comprehensive study of the state of health of adolescents and young people, using it as a base for the development of measures intended to further improve medical care for this group.

The author took anthropometric measurements of adolescents of two generations and developed standards of physical development, studied morbidity according to data on visits to a physician from the date of birth, as well as general medical examinations, determined the effect of certain sociohygienic factors on the state of health of adolescents, identified a relationship between physical development and morbidity, and

developed recommendations to improve the organization of therapeutic and prophylactic care for adolescents.

Professor N. S. Yag'ya and other members of the commission took part in the discussion of the report.

Professor N. S. Yag'ya noted that despite the significant value and timeliness of studies such as this, an attempt must be made for the proposed practical recommendations to be well-substantiated. The question of setting aside an additional position of uchastok adolescent physician-pediatrician when the position of school physician already exists is particularly controversial. The question of the directions for optimizing medical care for children and adolescents needs to be carefully thought out.

Professor M. S. Bedniy pointed out that the modern dynamics of the demographic processes present new tasks to the public health organization, not just the problem of morbidity prevention, but also the preservation of the health potential of the population, particularly the percentage who are able to work. It is specifically from these positions that the prevention of morbidity and the preservation of the health of children and adolescents must be considered as one of the priority tasks in the entire health system. Thus the performance of medical demographic studies like I. P. Polyakov's study take on special meaning at the present time. The identification of sociohygienic and public health factors in the state of health and physical development of children and adolescents makes it possible to give a scientific basis to measures for realization which will have not only a medical, but also a demographic and thus a socioeconomic effect.

Moreover, the state of health of adolescents and children is an area of social hygiene that has been relatively little-studied. While questions of infant mortality have traditionally received a great deal of attention, the health problems of children older than one year, particularly in the early adolescent period (10-14 years) receive less attention, even though the health of the adult population is formed to a significant degree during this age period.

In summing up the results for the meeting of the Problem Commission on Medical Demography, Professor M. S. Bedniy noted that the development and the scientific basis of an effective demographic policy is inseparable from a profound study of not just social and economic but also health factors of the dynamics of the demographic processes. This is exactly why further detailed study of the state of health of the population from medical-demographic positions is a timely social problem, the solution to which is intended to insure strong health for the future generations of Soviet citizens.

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YOUNG SCIENTISTS' CONFERENCES

Moscow ZDRAVOOKHRANYENIYE ROSSIYSKOY FEDERATSII No 3, Mar 84 pp 45-46

[Article by Ye. N. Savel'yeva and I. M. Virganskaya (Moscow)]

[Text] Every year the Faculty of Social Hygiene and Public Health Organizations of the II MMI [Moscow Medical Institute] imeni N. I. Pirogov, the leading medical VUZ of the Russian Federation, holds conferences dedicated to the memory of the founder of the department, Z. P. Solov'yev. On 28 November, 1983 the student scientific-theoretical conference "Physicians Against War" was held; members of student scientific circles from the faculties of Social Hygiene and Public Health Organizations, Medical History and CPSU History participated in it. Their reports were dedicated to Soviet peace initiatives (I. Lopukhov, CPSU History Faculty), the history of the physicians' anti-war movement (S. Sokolova, Faculty of Social Hygiene and Public Health Organizations), the role of physicians in the peace movement (S. Perekopskiy, Faculty of Social Hygiene and Public Health Organizations and I. Devyatov, Faculty of Medical History and Soviet Law), analysis of sociohygienic consequences of conventional and nuclear warfare (G. Solovkina, Ye. Vanenkov, Faculty of Social Hygiene and Public Health Organizations).

Instructors, graduate students and residents participated in the student conference. The voices of conference participants were joined to the powerful chorus of the anti-war movement.

On 30 November, the traditional Solov'yev Conference convened at the Faculty of Social Hygiene and Public Health Organizations of the II MMI imeni N. I. Pirogov consisting of associates, graduate students, and residents from Moscow Medical VUZes, and from the All-Union VNII [All-Union Scientific Research Institute] for Social Hygiene and Public Health Organizations imeni N. A. Semashko, and practicing public health workers.

Problems of the state of health of the population were discussed at the conference; procedural approaches to an evaluation of the health of different population groups were considered, as was the relationship between lifestyle and general health. In the course of the discussion it was noted that the importance of a sociohygienic study of various aspects of lifestyle as a factor directly influencing the health of the population is determined by the fact that these studies provide a scientific basis for

the adoption of primary prophylactic measures.

The conference was opened by N. Ya. Kopyt, professor at the Faculty of Social Hygiene and Public Health Organizations, II MMI, who stressed the currency of the scientific theme for the conference.

Characteristics of the state of health of the population, applying various criteria for its evaluation were presented in reports by graduate students from Faculties of Social Hygiene and Health Organizations, I. M. Virganskaya (II MMI imeni N. I. Pirogova), M. P. Bortkevich (Moscow Medical Stomatology Institute imeni N. A. Semashko) and Ye. A. Tishchuk (Friendship of Peoples University imeni Patrice Lumumba).

I. M. Virganskaya gave an analysis in her report of present-day tendencies and causes of death of the able-bodied contingent of the male population in a major industrial city. A large body of statistical material showed the role of accidents, poisonings and injuries in the mortality rate of men of working age; data were presented confirming the influence of the widespread use of alcohol on the death rate due to this group of causes.

M. P. Bortkevich reported on the results of sociohygienic analysis of the causes of primary disability of the urban population. The author stressed the need to study not only the objective causes and nosological forms causing disability in the population, but also the subjective opinion on the causes of disability leave.

Ye. A. Tishchuk's report, "Comprehensive Sociohygienic Study of Moscow Light Industry Workers" presented interesting data on the effect of a number of production, medical and family-personal factors on the level and structure of worker morbidity in this industry. A procedure for studying different aspects of lifestyle and the state of health of the working-age population suffering from ischemic heart disease, and stomach and duodenal ulcer disease and also sugar diabetes was presented in the reports of Ye. I. Nesterenko and A. A. Kalmykov (speaker, Ye. I. Nesterenko). It was noted that the currency of the study was due to the need for identifying adverse lifestyle factors (risk factors) that are common to these diseases, making it possible to determine more effective methods for the prevention of chronic pathology.

The report of A. N. Mitrofanov on the subject "Sociohygienic Characteristics of 4-5 Year Students" established the need for carrying out differentiated health education work with parents according to the level of their education, family makeup and conditions for raising children in the family.

The family plays a special role in the formation of a specific individual's lifestyle. Organizational and procedural approaches of a family study of rural inhabitants for the purpose of developing recommendations for improving primary medical health care for the rural population were considered in a report by N. S. Usachev on the subject "State of Health, Lifestyle and the Organization of Primary Medical Health Care for Rural Residents."

G. B. Kasatkin's report was devoted to the problem of organizing the campaign against alcoholism; it dealt with results of an experiment in improving the cooperation between various links of the system for combatting this phenomenon.

Professor Yu. P. Lisitsyn, corresponding member of the USSR Academy of Medical Sciences spoke at the conference of young scientists. He noted that the work of young scientists concerning problems of social hygiene and public health organization is making a significant contribution to the development of science.

In summarizing the results of the work of the conference, Professor N. Ya. Kopyt pointed out that the majority of reports heard were of a procedural nature. Their authors are beginning independent scientific work and already the first results indicate that they are on the right track. In the name of conference participants, he wished the young scientists further successes in their work.

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BRIEFS

NEW HOSPITAL ON KOLA PENINSULA--A project to build the largest hospital on the Kola Peninsula has been approved. It will be built near picturesque Okun Lake for the "Sevryb" V/O [All-Union (?) Association] in accordance with a project of the Murmanskgrazhdanproyekt institute. The four wards of the hospital are to provide 600 beds and will house diagnostic, surgical and treatment services equipped with the latest medical technology. The buildings will be constructed using frame construction and three-ply panels. The windows will be triple-glazed. [V. Voronov] [Text] [Moscow STROITEL'NAYA GAZETA in Russian 20 Apr 84 p 4 (23) 12344

CSO: 1840/622

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ENDOGENOUS GLUTATHIONE AS FACTOR IN EFFECTIVENESS OF SULFUR-CONTAINING
RADIOPROTECTORS

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 20 Sep 82) pp 749-753

KONSTANTINOVA, M. M., MININ, A. A., DONTSOVA, G. V. and PANAYEVA, S. V.,
Institute of Developmental Biology imeni N. K. Kol'tsov, USSR Academy
of Sciences, Moscow

[Abstract] Ehrlich ascitic tumor cells harvested from (CBA x C57Bl)F₁ mice were used in studies to determine the role of glutathione in the radioprotective effects of β -mercaptoethylamine (MEA) and β -mercapto-propionylglycine (MPG). The results showed that both MEA and MPG were effective in protecting the cells from chromosomal damage. The effects of both agents were attenuated by preincubation of the cells with N-ethylmaleimide, which binds glutathione, but not abolished even when the effective concentration of glutathione was reduced by 50-70%. Pronounced reduction in radioprotective effectiveness was noted only when the decrease in glutathione concentration exceeded 70% of the background level. Analysis of plots reflecting loss of radioprotection in relation to glutathione concentration and radioprotector dose, indicated that at low radioprotector concentration ($<10^{-3}$ MEA; 2×10^{-2} M MPG) endogenous glutathione determined the degree of radioprotection. At higher concentrations (10^{-2} M MEA) other factors, in addition to glutathione, are also involved in the mediation of the radioprotective effects of MEA and MPG. Figures 2; references 11: 4 Russian, 7 Western.
[612-12172]

RADIATION EFFECTS ON CELLULAR INTERACTIONS IN INACTIVATION OF NONSYNGENEIC STEM CELLS: RADIATION-INDUCED CHANGES IN B-LYMPHOCYTE FUNCTION

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 15 Nov 82) pp 761-764

PETROV, R. V., DOZMOROV, I. M., LUTSENKO, G. V., NIKOLAYEVA, I. S. and
RUDNEVA, T. B., Institute of Biophysics, USSR Ministry of Health, Moscow

[Abstract] A murine system for inactivation of hemopoietic stem cells was employed for analysis of B-cell inactivation/modification by gamma-irradiation (0.63 Gy/min) as reflected in T- and B-cell cooperation. Irradiation (77.4-232.2 mC/kg; 0.63 Gy/min) of the B-cells modified them from helpers to suppressors of killer T-cells with low electrophoretic mobility. Interaction of the irradiated B-cells with the T-cells abolishes the latter's ability to inactivate syngeneic hemopoietic stem cells, and imparts to them a stimulant function for the target cells. The mechanism responsible for the transformation of the T-cells from killers to stimulators remains to be elucidated. Figures 3; references 9: 8 Russian, 1 Western.
[612-12172]

RADIOSENSITIZING AND CYTOPATHIC EFFECTS OF HYPERTHERMIA: EFFECTS ON EHRLICH ASCITIC TUMOR CELLS

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 14 Jul 82) pp 770-773

SHTEYN, L. V. and KONOPLYANNIKOV, A. G., Scientific Research Institute of Medical Radiology, USSR Academy of Medical Sciences, Obninsk

[Abstract] Ehrlich ascitic tumors cells passaged in outbred mice were used in vitro exposure to a range of temperatures (0 to 42°C for 1 h) to determine the effects of such treatment on radiosensitivity (gamma-irradiation, 0.6 Gy/min). Incubation of the cells at 41 and 42°C was found to increase their susceptibility to the effects of subsequent irradiation, with the energy of thermal inactivation calculated at 150 kcal/min. Phase contrast microscopy revealed that the cytopathic effects of hyperthermia involved characteristic plasma membrane damage. Irradiation of the cells prior to exposure to high temperatures had no effect on radiosensitivity. Figures 3; references 8: 2 Russian, 6 Western.
[612-12172]

METABOLISM OF PLUTONIUM-239 IN CHEMICAL SKIN BURNS

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 23 Sep 82) pp 778-782

IL'IN, L. A. and BELYAYEV, I. K., Institute of Biophysics, USSR Ministry of Health, Moscow

[Abstract] Wistar rats were utilized in a study to quantify Pu-239 penetration via the skin following various chemical burns, using both organic and inorganic solvents in various concentrations. The uptake of the nuclide was measured by histoautoradiography. Uptake was seen to increase with the duration of application to the skin and varied with the nature of the chemical vehicle. The degree of uptake was directly proportional to the extent of injury to the skin and, in terms of absorption, the vehicles ranked as follows: $0.1 \text{ N HNO}_3 < 5\% \text{ tributyl phosphate (in hexachlorobutadiene)} < 20\% \text{ tributyl phosphate} < 50\% \text{ tributyl phosphate} < 1.0 \text{ N HNO}_3 < 2.5 \text{ N HNO}_3 < 10 \text{ N HNO}_3$. Most Pu-239 accumulated in the skeleton, followed by the liver, blood and the kidneys. Maximum absorption of Pu-239 through the skin occurred in situations when the nuclide was applied in a combined vehicle of HNO_3 and tributyl phosphate (in hexachlorobutadiene), reaching a level 25-fold greater than with 0.1 N HNO_3 . References 18: 8 Russian, 10 Western.
[612-12172]

EFFECTS OF INSULIN AND HYDROCORTISONE ON ENERGY METABOLISM IN RATS IRRADIATED WITH FAST, 60 MeV NEUTRONS

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 11 Oct 82) pp 805-807

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[Abstract] Certain parameters of energy metabolism were studied in rats irradiated with fast neutrons to define the endocrine mechanism responsible for changes in high-energy compound metabolism. Irradiation of the animals with 60 MeV neutrons with a single 1 Gy dose or two 0.5 Gy doses at 7 day intervals resulted in similar biochemical changes in hepatic and muscle tissues, consisting of a reduction in the concentration of ATP, total nucleotides, and elevation of the ATP/ADP ratio. Administration of exogenous hydrocortisone potentiated the effects of irradiation, while administration of insulin or of insulin+hydrocortisone combinations to the irradiated animals reversed or attenuated the effects of irradiation. These observations were interpreted to indicate that sublethal irradiation

induced an increase in glucocorticoid secretion via induction of lipid peroxidation. The elevated glucocorticoids were postulated to be responsible for depression of ATP synthesis, while the injection of the physiological antagonist of glucocorticoids--insulin--was successfully used to counteract the effects of glucocorticoids. References 12: 1 Ukrainian, 7 Russian, 4 Western.

[612-12172]

UDC 577.391:612.039.58

ESSENTIAL ROLE OF GLUTATHIONE IN SEROTONIN RADIOPROTECTION

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 6, Nov-Dec 83
(manuscript received 13 Sep 82) pp 811-813

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[Abstract] Ehrlich ascitic tumor cells were employed in a study designed to elucidate the mechanism of radioprotective action of serotonin, in which serotonin (10^{-3} M) was added to the cells before, concurrently with, or 5 min after irradiation. In each situation serotonin was equally effective, indicating that serotonin possesses both prophylactic and therapeutic properties. Addition of serotonin 20 min after irradiation significantly reduced its radioprotection. Addition of N-ethylamide before, during, or after irradiation diminished the effects of serotonin, and the reduction in the degree of radioprotection was proportional to the reduction in the concentration of sulfhydryl groups due to the irreversible binding of glutathione by N-ethylamide. These observations were extrapolated to indicate that endogenous glutathione mediates the radioprotective effects of serotonin. Figure 1; references 7: 4 Russian, 3 Western.

[612-12172]

UDC 577.391:599:323.4.615.857.064.13

TOXICITY AND RADIOPROTECTIVE PROPERTIES OF PYRIDAZINE DERIVATIVES

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(manuscript received 2 Aug 82) pp 813-816

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[Abstract] Determinations were made of the toxicity and radioprotective properties of 24 derivatives of pyridazine on (CBA x C57Bl)F₁ mice to

determine structure-activity relationships. Intraperitoneal administration of these chemicals in doses ranging from 6 to 1200 mg/kg 15-30 min before gamma irradiation with 9.5 Gy (0.89 Gy/min) and determination of the 30 day survival rate revealed seven compounds as moderately effective in giving 20-53% animal survival. The effective agents were 3-amino-6-butoxypyridazine (33%), 3-hydroxyethylamino-6-chloropyridazine (28-30%), pyridazine-3,6-dione (20%), pyridazine-3,6-dione/cyclohexylamine (33%), pyridazine-3,6-dione/di-ethanolamine (53%), 4,5-dihydropyridazine-3,6-dione (20%) and 1-vinyl-3-methylpyridazine-6-one (20%). These observations indicate that congeners with hydroxy-, alkoxy, amino- and aminoethyl groups should be investigated further for effectiveness as radioprotective agents. References 9 (Russian). [612-12172]

UDC 577.391.661.719

SIGNIFICANCE OF SULFHYDRYL GROUPS IN RADIOPROTECTIVE EFFECTS OF SULFUR-CONTAINING METHYLFURAN DERIVATIVES

Moscow RADIOBIOLOGIYA in Russian Vol 23, No 9, Nov-Dec 83
(manuscript received 20 Jan 82) pp 816-819

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[Abstract] Sulfhydryl-containing derivatives of methylfuran were tested for effectiveness as radioprotectors in terms of 30 day survival of gamma-irradiated (7.5 Gy = LD₉₅) albino mice. Administration of the agents intraperitoneally 15 min before irradiation in maximum tolerable doses yielded the following survival figures for the five compounds under investigation: 2-amidinoethyl-2'-furfurylmethyl sulfide HCl--25% (100 mg/kg) and 20% (150 mg/kg), amidinomethyl-2-furfurylmethyl sulfide HCl--35% (150 mg/kg) and 73% (150 mg/kg 1 h before irradiation), 2-guanidinoethyl-2'-furfurylmethyl sulfide HCl 50% (50-75 mg/kg) and 51% (100 mg/kg), S-2-furfuryl- -mercaptoethylamine HCL 70% (200 mg/kg), and bisfuroyl cystamine--55% (100 mg/kg), 46% (150 mg/kg) and 10% (300 mg/kg). Thus, sulfides with blocked sulfhydryl groups were seen to be highly effective radioprotectors, with the furfuryl residue evidently affecting distribution and metabolism of the agents but not their radioprotective effectiveness. These agents had no significant effect on the redox potentials of the spleen and the liver, nor did they change the concentration of the protein and non-protein sulfhydryl groups. They appear to exert their radioprotective effects by a mechanism different from that of the other sulhydryl-containing radioprotectors. References 8: 7 Russian, 1 Western. [612-12172]

β -ADRENERGIC MECHANISM OF ISOPROTERENOL RADIOPROTECTIVE EFFECT ON MAMMALIAN CELL CULTURE

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(manuscript received 29 Dec 81) pp 819-822

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[Abstract] The involvement of adrenergic mechanisms in the radioprotective effects of isoproterenol was studied with β -adrenoreceptor-containing Chinese hamster fibroblasts and β -adrenoreceptor-lacking mouse fibroblasts. Addition of isoproterenol (10^{-6} M) to the Chinese hamster cells led to accumulation of cAMP and a concurrent increase in radioprotection against gamma-irradiation (0.5-6.0 Gy). These effects of isoproterenol in the Chinese hamster cells were abolished by the addition of propranolol, an established β -antagonist. Isoproterenol failed to protect the mouse cells from gamma-irradiation and to induce elevation in cellular cAMP concentration, presumably because of their insusceptibility to this β -agonist because of the absence of β -adrenoreceptors. These observations demonstrate that the radioprotective effects of isoproterenol are dependent on the presence of β -adrenoreceptors in the mammalian system. Figures 3; references 10: 4 Russian, 6 Western. [612-12172]

UDC 577.391:612.273:612.824.1

ALTERATION OF BLOOD-BRAIN BARRIER PERMEABILITY BY COMBINED GAMMA-IRRADIATION AND VARIABLE INHALED GAS MIXTURE

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[Abstract] (C57 X CBA) F_1 female mice were employed in studies on the effects of gamma irradiation and oxygen concentration in inhaled air on the blood-brain barrier as measured by its permeability to acid fuchsin. Mathematical analysis of the time required for penetration of the dye into the brain tissue in relation to the radiation dose applied to the head or the body and the percentage of oxygen (8, 21, 99%) in the air, showed that irradiation of the body was more effective in increasing permeability to acid fuchsin than irradiation of the head. However, both hyperoxia (99% O_2) and hypoxic hypoxia (8% O_2) were more effective in alleviating the effects due to irradiation of the head (2.58 C/kg) than in correcting the effects consequent to irradiation of the trunk. References 9: 8 Russian, 1 Western. [612-12172]

RADIOBIOLOGIC ASPECTS OF FUNDAMENTAL TRENDS IN WORK OF NATIONAL COMMISSION
ON RADIATION PROTECTION DURING 1982-1986

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[Abstract] A summary presentation is made of some of the more important recommendations and interests of the National Commission on Radiation Protection during the period 1982-1986. Basically, and in recognition of the development of the atomic energy industry in the USSR, emphasis was placed on further research on dosimetry and substantiation of maximum exposure limits to ionizing radiation. Radioecology, radioprotection of the population and occupational groups in case of atomic accidents, and further assessment of medical complications of radiation exposure and long-term genetic consequences were also targeted by the commission for further research. References 6: 5 Russian, 1 Western.
[612-12172]

VIROLOGY

CONTROL OF ARBOVIRAL DISEASES IN ESTONIA

Tallinn SOVETSKAYA ESTONIYA in Russian 11 Apr 84 p 3

[Article by V. Vasilenko, Chief of the Virology Department, Tallin Scientific-Research Institute of Epidemiology, Microbiology and Hygiene, candidate of medical sciences: "Arboviruses and Human Health"]

[Text] The Plenum of the All-Union "Arboviruses" Problem Commission meets in Tallinn today.

Viral diseases that are associated with infectious breeding grounds in nature itself are known to medicine. For example, the viral etiological agent of tick-borne encephalitis circulates among animals (elk, boars, forest rodents, hares, etc.), birds, and insects in specific geographic regions with specific microclimates. The virus is thus transmitted from one species of animal to another through the bite of an infected insect, such as a tick or mosquito. Viruses that are carried by insects are also called arboviruses. They are distributed in all continents and pose a serious health problem in many countries of the world. The morbidity level of these infections is rather high in certain regions of our nation.

There are about 90 known arboviruses. They cause severe illness in humans by attacking the CNS with subsequent high degree of mortality. There are as yet no specific cures. Live inactivated vaccines are used as a preventive against certain arboviral infections (tick-borne encephalitis, yellow fever).

Tick-borne encephalitis is a significant factor in our republic. For more than ten years, at the commission of the ESSR Ministry of Health, virologists of the Scientific-Research Institute for Epidemiology, Microbiology, and Hygiene, together with specialists of the Sanitary-Epidemiological Service, have been making comprehensive efforts to identify arboviral breeding grounds in the rayons, and are studying factors that contribute to the existence of such infectious foci in nature. Tick-borne encephalitis morbidity and causes of encephalitis outbreaks are also topics of investigation.

Control of arboviral infections is particularly difficult because the foci, as was mentioned earlier, are distributed almost everywhere, and the diseases can be transmitted from continent to continent even by bird transmigration. Therefore, successful prophylaxis most importantly requires

the coordinated efforts of scientists and specialists in the rapid diagnosis of these infections and their investigation of their geographic distribution characteristics and ecology.

The Plenum's work was devoted to the task of coordinating research directions, identifying future studies, and discussing the research results of recent years.

Its program included the presentation of 38 papers and 12 exhibit-type reports. Over 200 scientists from 11 republics and 17 cities of the nation participated in the preparation of the Plenum's position papers.

Also participating in the Plenum are specialists from the head institute on the problem viz., the Institute of Virology imeni D. I. Ivanoskiy of the Academy of Medical Sciences and the Institute for Poliomyelitis and Viral Encephalitides Academy of Medical Sciences of the USSR (Moscow).

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CSO: 1840/599

CONFERENCES

BRIEFS

CONFERENCE OF GENETICISTS--Kiev, April 18 (Ratau Corr. E. Alikhanyan). The first All-Union Conference of Medical Geneticists was held today in the Ukraine's capitol.

N. P. Bochkov, Academy of Medical Sciences academician and director of the Institute of Medical Genetics, commenting on the forum's goals, said that genetics today is moving swiftly to the forefront of medicine. With its aid, it is possible today not only to predict a person's health even before his birth, but also to influence the development of hereditary symptoms. In our country, early diagnosis and effective treatment of hereditary diseases are placed on a solid scientific foundation. Specialists already are very aware of how to correct what is "inscribed in his lineage book".

Modern hereditary catalogues include more than 3500 traits. The features of geographical and ethnic spreading of many diseases have been studied and scientists have been able to determine not only the rule, but also the subtle mechanism of hereditary transmittal of genetic information and to penetrate the secret of the primary molecular-biological cause which lies at the basis of the disease process.

Preventive treatment of diseases is becoming more and more essential. The fact is that hereditary predisposition plays a definite role in the development of cardiovascular, oncological and other diseases. This is why biochemical methods of so-called screening diagnosis are important, along with the system of massive diagnoses of people who are adapting to the scale of entire republics today. There is another important aspect of this problem--control of hereditary abnormalities, which appear as a result of pollution in the environment.

An important role in future development of clinical medical-biological and social-hygienic problems in this area of science will be played by the All-Union Scientific Society of Medical Geneticists. The conference decided upon its regulations and elected the board of directors and the revisory commission. [Text] [Kiev PRAVDA UKRAINY in Russian 19 Apr 84 p 2] 12473

BRIEFS

SYMPOSIUM ON LASER MEDICINE--Kaunas, May 14 (EL'TA). An all-union symposium on problems in laser medicine began here today. Specialists in medicine and physics from the central scientific institutions of the nation, as well as fraternal republics, are taking part. The symposium was organized by the laser sections of the Academy of Sciences of the USSR and the Academy of Medical Sciences of the USSR. The purpose of the symposium is to discuss technical problems in the area of laser medicine, to generalize initial practical achievements in the laser treatment of cardiac diseases, to mark out the boundaries of further work, and to become acquainted with the experience of Kaunas cardiac surgeons. A laser surgery center is being created at the Kaunas Medical Institute's clinic on the initiative of corresponding member of the Academy of Medical Sciences of the USSR professor Yu. Bredikis. Here, in collaboration with a group of Moscow scientists, a patient's cardiac rhythm was restored with the aid of a laser beam for the first time in medical practice. This unique operation, performed almost a year ago, verified the specialists' prognoses and gave the "green light" to this method. Laser beams are now being used to treat other disturbances in cardiac activity. The laser was also used in Kaunas for the first time by cardiac surgeons to combat ischemic heart disease. The symposium will be held over a two day period. [Text] [Vilnius SOVETSKAYA LITVA in Russian 15 May 84 p 3 (29)] 12344

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